

SOUTHERN POWER AND INDUSTRY

Ad rates, page 98 DECEMBER 1952

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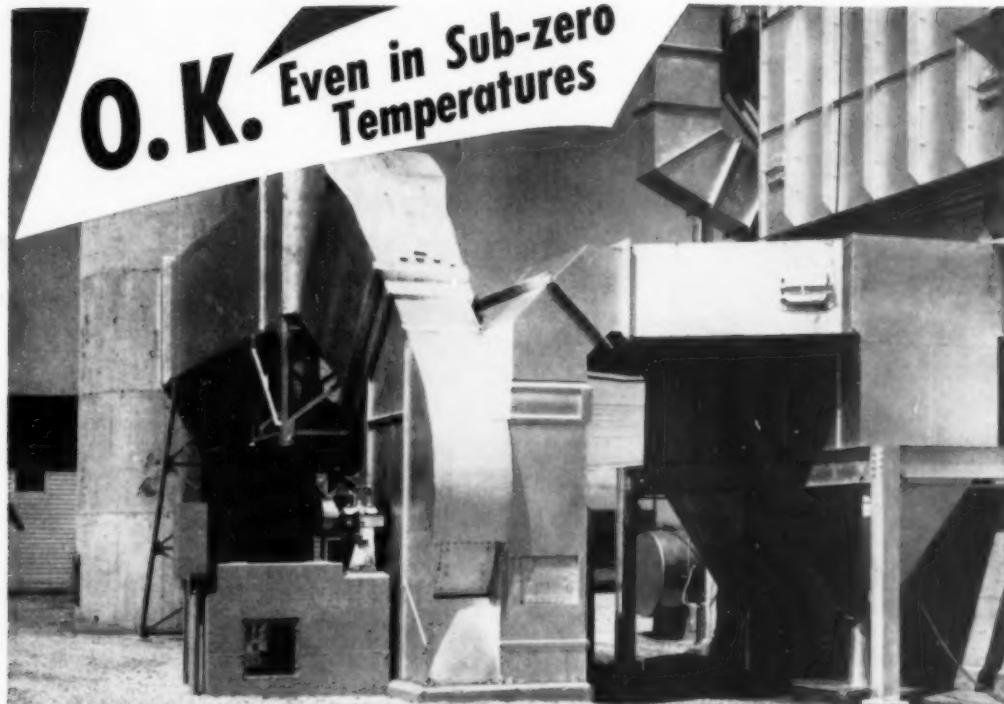


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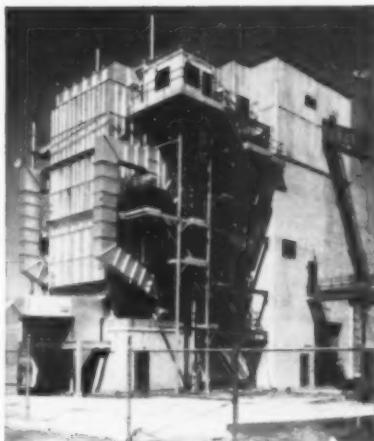
Above is a Clarage Type RT Fan furnishing induced draft for a Riley Steam Generating Unit in Superior, Wisconsin — a recently completed 12,650 KW extension to the Winslow Station of the Superior Water Light & Power Company. Forced draft is also supplied by Clarage.

Here is a completely outdoor installation located where winter temperatures of 30 to 40 degrees below zero are not exceptional. Unprotected equipment to function properly in such a rigorous climate must be good!

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assured these turbines at
Pratt & Whitney Aircraft

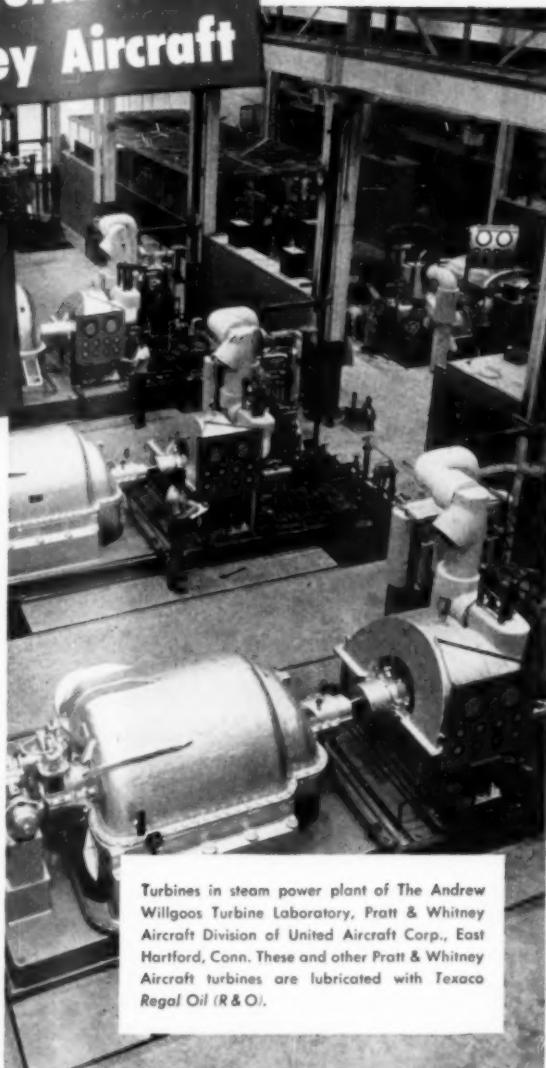
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Turbines in steam power plant of The Andrew Willgoos Turbine Laboratory, Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn. These and other Pratt & Whitney Aircraft turbines are lubricated with Texaco Regal Oil (R&O).

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SOUTHERN POWER AND INDUSTRY

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Associate Editor

Hunter Hughes
Regional Editor

M. M. Lyon
Associate

J. A. Moody
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Business Representatives

E. L. Rogers, 299 Madison Ave.,
New York 17, N. Y.—Phone
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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1952.

- IT IS OUR RESPONSIBILITY — yours and ours alike — to help spread a better understanding of fundamental economic facts among our associates (for instance, the fact that a higher standard of living can result only from increased production, not from increased money supply).

That's why we're starting, in this issue, what we feel will be the most important series of articles ever published in any business or industrial magazine. It will be a series of discussions on the economic "facts of life" by Americans of national prominence. The material is being written especially for SP&I and other W.R.C. Smith publications.

In this issue, Laurence F. Lee, President, Chamber of Commerce of the United States, discusses HOW MUCH GOVERNMENT SHALL WE HIRE? In January, Senator Harry F. Byrd will deal with THE PROBLEM OF GOVERNMENT SPENDING.

- CAUSTIC EMBRITTLEMENT INVESTIGATIONS in the past have been largely confined to magnifications of 100x to 500x. The path and progress of caustic embrittlement cracking by the use of HIGH MAGNIFICATION is featured in this issue of SP&I. Mutual Boiler and Machinery Insurance Company engineers present an unusual series of photomicrographs at 2000x which show for the first time, they believe, the initial or embryo stages of the apparent encircling action taken by the embrittlement crack.
- MORE GAS TURBINES FOR THE SOUTHWEST -- After 3 years and 23,000 hours of operation of a G-E gas turbine without service repairs, Oklahoma Gas & Electric Company placed a second 4,000 kw turbine in service at its Belle Isle generating station. Two gas turbine units and two larger steam turbine-generators in the powerhouse use natural gas as fuel. Exhaust of the two gas turbines is used to heat boiler feedwater for the steam units whose total rated capacity is 50,000 kw.

West Texas Utilities Company has installed a 5,000 kw simple open-cycle Westinghouse gas turbine in its Fort Stockton, Texas, station. The 42 ft long x 10 ft wide unit is capable of producing 6,000 kw of power. Turbine operates at 5,700 rpm, and is connected to a 3,600 rpm generator by a single-reduction double helical gear.

- MOST OF THE WORK LOAD at the Firestone Textiles Division of the Firestone Tire and Rubber Co., at Gastonia, N. C., has been assumed by a 6-story "Ferris Wheel" conveyor. The roundabout tray elevator affords \$25,000 annual saving and frees freight elevators for other duties.

Moving 1300 lb beams of rayon and 900 lb box trucks in and out of freight elevators was a back-breaking job. Yet, approximately 230 of these bulky loads had to be lifted (and empties returned) every day. With the new Gifford-Wood Co. roundabout tray elevator, beams and trucks are automatically picked up on the loading side of a shaftway by trays suspended between two endless chains, carried to the top, eased over the drive sprockets, lowered to the desired floor, and automatically discharged.

(Continued on page 6)



BULLETIN
609



most acclaimed manual starter on the market!

Bulletin 609 hand operated starters are the recognized standard for starting and stopping small a-c motors in these maximum ratings:

Single phase— $1\frac{1}{2}$ hp, 110 volts; 3 hp, 220 volts.

Polyphase—5 hp, 220 volts; $7\frac{1}{2}$ hp, 440-550 volts.

Ideal for industrial applications where remote push button control stations and no-voltage release are not required.

- No Contact Maintenance—The large double break, silver alloy contacts never need cleaning, filing, or dressing.

- Quick Make and Break—A simple toggle opens and closes the contacts with a snap action, preventing contact burning.

- Push Button Operation—Convenient "Start" and "Stop" buttons make the Bulletin 609 so easy to operate.

- Reliable Overload Protection—Two manually reset breakers protect the motor at all times from sustained overloads.

- Small Size—In spite of high current interrupting capacity, Bulletin 609 manual starters are small in size.

- Easy to Install—Lots of wiring room, terminals accessible from front, and knockouts on all sides of cabinet.

- Bonderized Enclosure—Bulletin 609 starters have pressed steel cabinets, bonderized to prevent corrosion.

- Trouble Free Service—Millions of these starters in operation testify to their satisfactory performance.

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wis.

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ST. LOUIS—G. W. Schmidlin, 904 No. Grand Blvd., Tel. Lucas 1901-02

SAN ANTONIO—Wilson Elect. Equip. Co., P.O. Box 5121, 101 E. Maple St., Circle 4-1471

SAN DIEGO—James A. Scitell, 301 W. "G" St., Tel. Franklin 3981

TULSA—John W. Elder, 1341 S. Boston, Tel. 3-0950

facts and trends (continued from page 4)

- WATCH FOR THE JANUARY ISSUE of SP&I featuring the first of a series of seven "Question and Answer" articles to help plant men become more intimately acquainted with the electrical equipment in their charge. Series will cover distribution and controls; synchronous, three phase, and single phase motors; technical and design data and generator and motor selection. Author of the seven part series, ELECTRICAL EQUIPMENT FUNDAMENTALS is Mr. A. T. Lohkamp, Superintendent of Power Plant, Pasco Packing Co., Dade City, Florida.
- ATOMIC POWER OUTLOOK — No practical method is now known or contemplated for converting atomic energy directly to electricity. G.E. emphasizes that ultimately, considerable amounts of our power may be produced atomically but in the foreseeable future, it seems certain that any such production will be subject to some fundamental limitations.

The energy released from the splitting atom would appear as heat, which could then be carried by a liquid or a gas to a heat exchanger, or boiler, where steam would be generated. The steam would then drive a steam turbine-generator to produce electricity. The atomic reactor and some auxiliary equipment, including the heat exchanger, would merely replace a fuel-fired steam boiler. From that point on, the atomic plant will be essentially the same as one burning coal, oil or gas as a fuel.

Of the total price now paid by the consumer for fuel-generated power, only 20 - 25 per cent goes to pay for the fuel itself. Hence, even free nuclear fuel would cause a reduction in power costs of only 20 - 25 per cent. This is hardly in keeping with some of the more fanciful pictures that have been drawn as to the effects of atomic energy.

- INDUSTRIAL COOLING TOWER FAN BLADES made by the Koppers Aeromaster fan department are being coated with Aeroloid, a plastic coating with an acetate-buryrate base. Heretofore plastic has not been applied to fan blades except in laminate forms -- an exacting and time-consuming process which required hand-forming of the plastic sheets after they had been softened by solvents.

In the Koppers Company - Tennessee Eastman process, blades are primed, dipped in the liquid plastic and heated to slightly over 100 F. The final product has the desirable qualities already found in laminated wood blades plus improved resistance to combustion, warpage and normal abrasion.

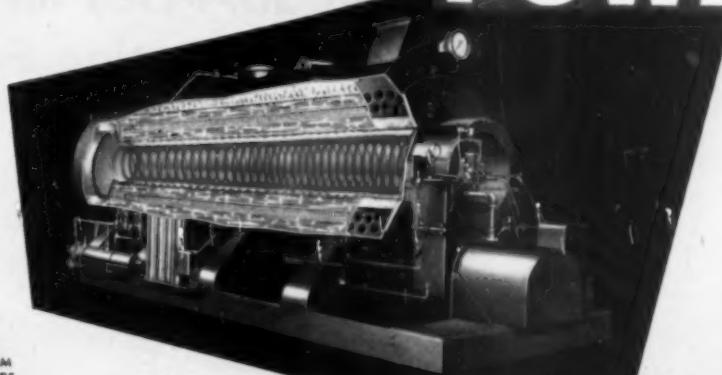
- HOW ABOUT YOUR RESEARCH NEEDS? A firm in a competitive field should spend at least 2 per cent of its gross income for development of new products and processes. Scientific research is often thought of as being only for big business; and of course, a business must be big in order that 2 per cent of its income may cover the expenses of an elaborate research laboratory. Small business men should realize, however, that they can buy as little as \$5000 worth of research, or even \$500 worth.

Recent growth of research activity in the South and Southwest is evident from the establishment of 103 complete new laboratories or major research additions during the past 12 months. Data on the region's accomplishments was given by H. McKinley Conway, Jr., Director of the Southern Association of Science and Industry before the Ninth Annual Southern Industrial Development Conference in Charlotte, N. C.

He emphasized that so far as is known to him, not one consulting research organization in the South makes a charge for a preliminary discussion. This means that a business man without obligating himself or spending a dollar can outline his problem and get reliable advice as to whether it would be feasible to set up a research project for further study.

66% more steam generating

POWER



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Meet the Cyclotherm folks at Booth 15C,
National Power Show, Grand Central Palace,
New York City, December 1-6.

66% CYCLONIC COMBUSTION

Cyclonic Combustion is the revolutionary new flame control that reduces heating surface requirements from 5 to just 3 sq. ft. per boiler horsepower . . . to produce 66% more steam generating power per sq. ft.

Used exclusively in Cyclotherm Steam Generators, Cyclonic Combustion controls flame characteristics in a revolving spiral vortex traveling the full length of the combustion chamber. The cyclonic flame constantly heats every part of the chamber, itself a complete heat transfer unit. 65 to 75% of the heat transfer is obtained in the chamber, with the result that only one return pass is required to deliver a guaranteed minimum efficiency of 80%.

The high efficiency of Cyclonic Combustion, plus simple compact design enables Cyclotherm generators, complete with fiber glass insulation, to save up to $\frac{1}{3}$ the space of conventional package steam generators.

Cyclotherm generators operate on gas, oil or a combination of both. Complete combustion of

fuel particles in the combustion chamber results in greater fuel savings and eliminates the need for extensive stack facilities. Inspection and cleaning is a minor operation with no time loss caused by boiler shutdown.

Cyclotherm arrives complete . . . 5 easy connections—fuel, electricity, water, steam and a simple flue—and Cyclotherm is ready to generate steam for any purpose. Full power operation from a cold start in 15 to 20 minutes. Boilers are designed for 18 to 500 h.p., 15 to 200 psi pressures.

The Cyclotherm meets all state requirements and is built in accordance with A.S.M.E. and National Board Standards and bears the label of Underwriters Laboratories, Inc.

Proved superior in thousands of installations, Cyclotherm steam generators with Cyclonic Combustion offer the most efficient and compact package steam generator on the market today. Write today for the free illustrated folder.

CYCLOTHERM STEAM GENERATORS



Cyclotherm Division U.S. Radiator Corp.

Dept. 34

Oswego, New York

Please send without obligation my copy of "All Your Questions Are Answered by Cyclotherm."

Please send a Cyclotherm representative to speak to me about Cyclotherm.

NAME _____

FIRM _____

ADDRESS _____

NEW EQUIPMENT and SUPPLIES for the Plant Engineer and Operating Force

Flexible Coupling Design

N-1 LOVEJOY FLEXIBLE COUPLING COMPANY, 5001 W. Lake St., Chicago 44, Illinois has announced the type "C" coupling. With the collar held in place by a multiple leaf spring, the coupling is claimed to withstand considerably higher speeds—increases up to 50 per cent—with complete safety. Both bodies are machined alike for the removable steel collar so that it may be readily slipped on either half of the coupling.

Ease of installation and large bore capacities are other features of the unit. These couplings are designed for use on motor-driven or engine-driven pumps, compressors, generators, pulverizers and almost all machinery of 50 to 1,000 hp.

As with all Lovejoy couplings, the Type "C" model instantly adjusts for misalignment, shock, vibration, oscillation, surge or backlash. Half of the

Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

cushions are idlers—except on reversing load—so a set of new cushions is always in the coupling. Shutdowns are thus eliminated, since load-cushions are quickly interchanged without tearing down the couplings.

Cushions are always in sight. There is no wear on metal jaws and couplings operate quietly for a lifetime with no lubrication ever needed. In addition to the Type "C," Lovejoy builds couplings for services from 1/6 to 2,500 hp.

For your free catalog and coupling "Selector Charts," circle the above code number on the reader service coupon post card—page 17.



Multiple leaf spring adds 50 per cent to safe maximum speed of the Lovejoy Flexible Coupling Company's design. The Type "C" coupling requires no lubrication.

Improved Line Purifier

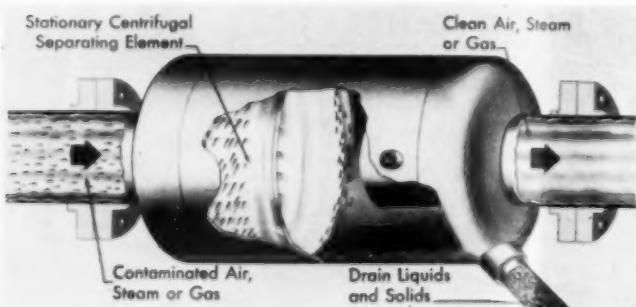
N-2 THE V. D. ANDERSON COMPANY, 1935 West 96th St., Cleveland 2, Ohio, announces that steam, air, gas and vapor lines in all types of industry are cleaned up quickly and thoroughly by an improved line type Hi-eF Purifier which combines increased separating efficiency with a more simplified design.

This compact, simply designed purifier performs automatically and with-

out any moving parts or baffle plates whatsoever, removing virtually 100

per cent of all dirt, oil, moisture and gunk even at extreme velocities and pressures.

A few of the applications for this unit are to clean up steam from boilers so as to protect reciprocating engines, turbines, super-heater tubes and other equipment, to remove moisture, oil, etc., from gas lines between and after compressor stages, to protect steam ejectors, valves and other expensive pipeline equipment, to remove entrainment in exhaust steam and vapor applications which attach surfaces when vented to the air, and to clean up exhaust steam for further economic use.



Open-End Ratchet Wrench

N-3 KELLER TOOL COMPANY, Grand Haven, Mich., has developed ratchet wrenches for reaching into inaccessible places and applying power to turn down nuts.

Where the nuts cannot be engaged
(continued on page 10)



DURASHEATH goes **all** the way—underground, overhead, in ducts—with **out** splices

Splicing cable is time-consuming . . . and costly. What's more it is avoidable. All-purpose Durasheath® can be used for almost any distribution need up to 5 kv.* It can be run in one continuous length, regardless of location . . . buried underground . . . strung overhead . . . or easily pulled through ducts. No expensive splices are necessary . . . no weak power links . . . no cluttered inventory. One cable—flexible, light Durasheath—goes all the way. You can stock one type instead of *three*.

Durasheath handles easily and is used in self-supporting aerial assemblies. Its rugged neoprene jacket resists moisture, chemicals, sunlight, organic decay, corrosion, electrolysis, abrasion, and mechanical injury.

For reliable power distribution at *lower* installation cost, insist on versatile Durasheath. See your nearest Anaconda Sales Office or Distributor, Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

®Trademark 1952

the right cable for the job

available in all sizes —
from large to small —
one to three conductors —
** can be supplied for
services up to 15 kv.
Consult Anaconda for
recommendations.

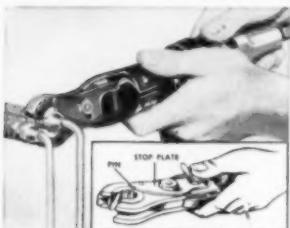


for traffic control, airport[†] power and lighting, mines,
industrial plants, railroads, street lighting and many other uses
[†]when ordered to CAA Specification L-824

ANACONDA wire and cable

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

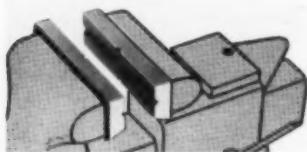


The Keller Tool Company's new ratchet wrenches are available in two sizes capable of handling hex nuts ranging from $\frac{1}{8}$ to $\frac{1}{2}$ in. across flats.

by a closed end socket, as when installing refrigeration tubing or hydraulic piping, an open-end ratchet wrench is necessary. It may be used either to tighten or remove unions, junctions, and couplings. The company has now announced that their open-end pneumatic ratchet wrenches may be obtained in a new design which stops the socket positively in open position. A stop plate is built into the side plate of the wrench. When the operator's thumb is pushed against this plate, it moves forward and engages a pin in the socket, which automatically stops it in open position, for quick removal and engagement of the next nut.

Vise Soft Jaws

MAGNE-GRIP TOOL COMPANY,
N-4 4900 W. Madison St., Chicago 44, Ill., has introduced a new type of soft jaws for vises. By utilizing built-in permanent magnets, Magne-Grip soft Jaws are snapped into position quickly and easily, and can be removed by simply lifting them off.



No springs, clips, screws or tools needed to install or remove Magne-Grip Tool Company's vise soft jaws.

A two-way V-groove locks the work in, holding it in any position desired, regardless of size or shape. The devices are made of an alloy that will not mar, scratch or gouge delicate finishes or highly polished metals.

Bin Level Control

N-5 THE FOXBORO COMPANY, Foxboro, Mass., has developed the Model 40 Rotax Controller, to automatically measure fly ash, collected in a Cottrell precipitator, and to control the bin level by a single instrument.

The low-cost system is applicable for chemical, power and processing plants.

If desired, the Rotax Controller can be installed to operate a screw conveyor, belt or other motor driven equipment, automatically emptying the bin or tank when the desired level is reached.

The system is said to be equally effective for most bulk materials, provided their temperature in the bin is considerably above or below the ambient temperature.

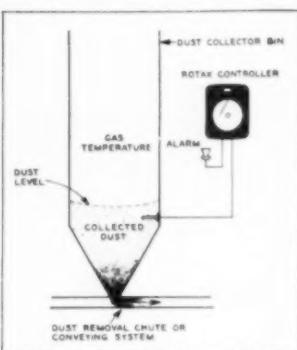


Diagram of Foxboro's dust level control system. Temperature bulb, mounted inside precipitator, normally senses the higher temperatures of the flue gases from which the dust is precipitated. When the dust deposit covers the bulb (acting as insulation) the controller, responding to the resulting lower temperature completes an electrical circuit through its contacts to sound an alarm and alert the operator.

Open End Ratchet Wrench

TUBING APPLIANCE COMPANY, 10321 Anza Ave., Los Angeles, Calif., has developed an all purpose, open end wrench, which is said to be applicable to many industrial uses.

A steel company's maintenance department has used the wrench for removing and replacing a $1\frac{1}{2}$ in. union fitting in a particularly hard-to-get-at location with a limited wrenching arc, on the hydraulic system controlling the operation of the coil car in the temper mill.

The exclusive open end design makes it possible for the serviceman



Application view of the TAC Open End Wrench, manufactured by the Tubing Appliance Company of Los Angeles, California.

to slip the wrench head and socket over the tubing and up onto the union fitting where it is speedily ratcheted on or off, with only a 7 degree arc wrenching area to work in. When the job is completed, the wrench is simply slipped off the fitting, the openings on the head and socket are realigned, and the wrench is removed.

In addition to the open end and strong steel alloys used in the wrench, other features include: extra thin wall sockets from $\frac{1}{8}$ in. to 4 in. in $1/16$ in. increments and in 64 sizes; a full hinge, square drive, removable handle; ratcheting arc to 5 degrees; and adapters which allow ordinary sockets to be used with the wrenches.

Welded Heat Exchanger Tubes

ALUMINUM COMPANY OF AMERICA, 801 Gulf Bldg., Pittsburgh 19, Pa., is now producing and marketing welded aluminum heat exchanger tubes made by longitudinally butt welding Alclad 3S-H12 aluminum alloy sheet, rather than drawing seamless aluminum tubes. The same process may be used in making tubes for applications other than heat exchangers.

In the two standard sizes now available, 1-in. outside diameter with .049-in. and .065-in. wall thicknesses, welded aluminum heat exchanger tubes cost less than seamless aluminum tubes and substantially less per foot than tubes of other commonly used metals.

The welded heat exchanger tubes

(Continued on page 123)



walk inside this control panelboard ...prefabricated by PANELLIT

You will find many new and unique features of engineering and construction in recently installed power station control systems . . . built by PANELLIT.

On every installation, excellence in fabrication and finish on the panel front is only exceeded by the ingenious behind-the-panel engineering for which PANELLIT is well-known. This engineering foresight assures the long-term serviceability of your entire control system. It will be recognized and appreciated for years to come by those responsible for maintenance and service.

PANELLIT maintains a separate Power Division with engineers specifically experienced in the design and installation of controls for the Power Industry. And, since PANELLIT is not an instrument manufacturer, it can be completely unbiased with respect to engineering assistance as well as the selection of controls for each phase of your system.

PANELLIT, INC.

General Offices: 6312 North Broadway
Chicago 40, Illinois

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SOUTHERN POWER & INDUSTRY for DECEMBER, 1952



BRIEF FACTS

ABOUT THIS INSTALLATION

Installation shown is the Central Control Room at the Edge Moor Station of the Delaware Power and Light Company, engineered and installed by United Engineers and Constructors, Inc., Philadelphia, Pa.

Prefabricated entirely by Panellit, Inc., the four-wall control panel forms the control room. An inner wall is the control panel front on which the instruments are mounted; the insulated outer wall serves as the outside wall of the control room and holds all contactors and electronic equipment associated with the combustion control.

LITERATURE WILL BE SENT UPON REQUEST.



**A nontechnical report to management
concerning profits**

They did what you can do to make money

To turn down time into productive time is one place management can look to for added profits.

A leading coal company, engaged in strip mining, needed an electrical shovel that would move more than a million cubic yards of earth per month. One that could maintain round-the-clock operation with minimum down time.

Together with the shovel manufacturer, Westinghouse creative engineers had developed a complete electrical system and a series of drives that would stand up under the most rigorous operating conditions. The result of the shovel's operation is typified by the coal company's comments:

"We all recall the moving of a million and a half cubic yards of earth in *one month*. (A world's record.) The *monthly average* for the year was well over a million cubic yards."

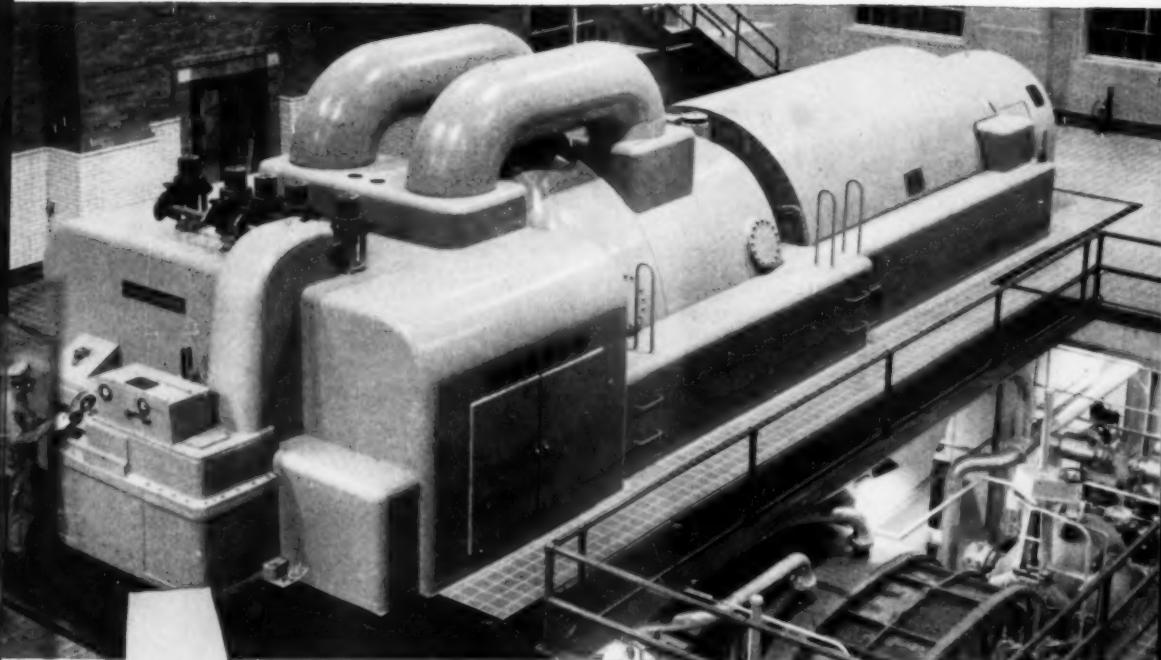
This same *creative engineering* applies to every industry, every manufacturing process. It is a part of the total Westinghouse services you can use to your profit . . . for application, installation, emergency or periodic maintenance.

We want to do the kind of planning with you that will apply these engineering services to your problem . . . to save time, to save money, to make money, to produce more with what you have. Westinghouse Electric Corporation, Pittsburgh, Pa.

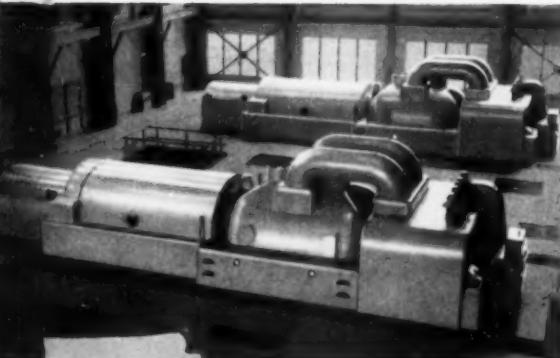
**YOU CAN BE SURE...IF IT'S
Westinghouse**



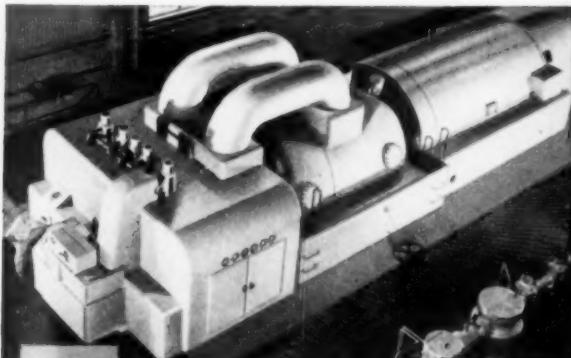
POWER for the



ALABAMA area has experienced an industrial power consumption rise of over 12½% in one year's time. To help meet this rocketing power demand, the Alabama Power Company just recently installed this Allis-Chalmers 40,000 kw steam turbine hydrogen cooled generating unit at its Chickasaw station in Mobile. A-C also supplied the 30,000 sq ft surface condenser and its auxiliaries, including two 25,000 gpm circulating pumps and motors.



ARKANSAS has the largest U. S. deposit of bauxite ore, primary to the production of aluminum. These two Allis-Chalmers 40,000 kw condensing, tandem compound steam turbine hydrogen cooled generating units form the Lake Catherine steam-electric station of the Arkansas Power & Light Company. Most of this power is used to electrolytically reduce alumina.



LOUISIANA industry and agriculture are mushrooming. The Gulf States Utilities Company — serving an area from Baton Rouge to across the Brazos River in Texas—has doubled its customers and tripled its power generation in the last decade. A-C recently supplied 75,000 kw in generating capacity to Riverside station near port city of Lake Charles. Unit shown is 40,000 kw.

Booming South!

NEW ALLIS-CHALMERS TURBINE-GENERATORS HELP SUPPLY MUSHROOMING INDUSTRIAL DEMAND

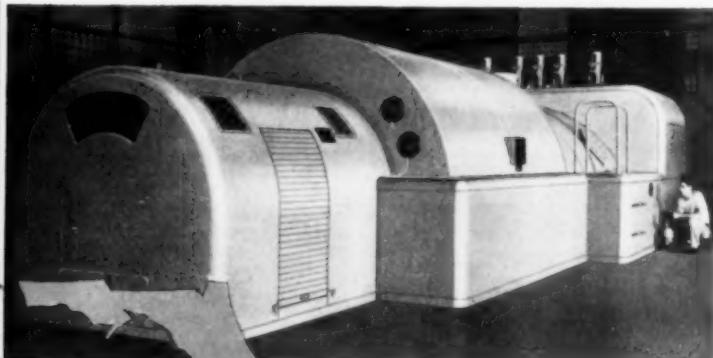
YOU'VE HEARD OF the South's mushrooming industrial growth. Here are some of the Allis-Chalmers steam turbine generator units newly installed to help satisfy that insistent power demand.

All these modern units conform to AIEE-ASME preferred standards in addition to incorporating many exclusive Allis-Chalmers main design features. The hydrogen cooled generators all have the A-C originated "walk-in" exciter housings. And these 3600 rpm turbines all have the following outstanding features:

Hydraulic control and operation with accessible placement of main stop valve; centralized grouping of operating controls; cam-operated inlet valves accessibly located on top of cylinder; and exclusive A-C method of temperature compensation for horizontal and vertical thermal movement.

All oil piping is above the floor, simplifying foundation and installation. And, as throughout the complete Allis-Chalmers line—ranging from the smallest single cylinder machines to single shaft, tandem compound, condensing units of 150,000 kw—labyrinth steam seals are used. The steam sealed gland system is self-contained and provides dependability with minimum attention.

You get the real design advances *first* from Allis-Chalmers. When planning the installation or expansion of your steam-electric power plant, let A-C simplify your problem. This *one* source will provide you with the world's widest range of power plant equipment. For your copies of literature on all products mentioned, call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3842



FLORIDA is also experiencing an industrial and agricultural rebirth. Supplying additional power is this 20,000 kw, 3600 rpm steam turbine hydrogen cooled generating unit located at Lakeland, in the center of the Florida peninsula.

ALLIS-CHALMERS *firs*ts

simplified hydrogen seal
and control

World's lowest exhaust
pressure steam turbines

Solidly-bolted-down
steam end pedestal

Turbine for one-boiler-per-
turbine arrangement

"Walk-in" exciter housing
30,000 kw, 825 F turbine,
in 1931

825 F reheat turbine, in 1935
AND NOW...First with super-
charged hydrogen cooling!

ALLIS-CHALMERS

World's Widest Range of Power Plant Equipment

TURBINES &
GENERATORS

CONDENSERS
& PUMPS

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& BREAKERS

MOTORS &
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WHERE TO GET IT

And How to Do It

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

14 FUEL OIL PUMPING AND HEAT- ING SYSTEMS—Bulletin OH-21

Description of pump and heating systems with illustrations of various equipment units to handle all grades of fuel oil as required by every type of oil burner.—THE ENGINEER CO.

18 STEAM GENERATOR—Bulletin S-116—Describes illustrated, de-

scribes the fully automatic American generator, available in sizes from 10 to 500 H.P., and pressures from 15 to 260 psi—for oil or gas firing—AMES IRON WORKS.

25 STEAM BOILERS—Catalog, 12 pages, describes oil and gas fired steam boilers for process and heating in sizes from 15 to 500 horsepower, and 15 to 200 psi. Diagrammatic cross section illustrations show four pass design.—CLEAVELAND BOILERS CO.

**26 OVER-FIRE JETS TO PREVENT
SMOKE**—Technical Report, No. VII, 24 pages, describes the application of over-fire jets to prevent smoke from stationary plants using coal—how to design, construct and install, and how to use.—BITUMINOUS COAL RESEARCH, INC.

30 STEAM GENERATORS—Catalog 1218—Describes packaged units 15 to 500 hp. Gives construction details of models for single or multiple fuel firing.—ORR & BREMBOWER, INC.

46 FUELS CONVEYOR—Bulletin—De-
scribes the new slow-speed stoker-feeder and industrial conveyor for particular application in the boiler room. The "Flow-Matic" conveyor saves on coal, ash and refuse-handling. With minimum power, a 15 ft. screw conveyor delivers up to 500 B.H.P. of coal, sand, sawdust, hogged wood or fuel.—AMERICAN COAL BURNER CO.

48 BOILER TUBES—Booklet, avail-
able upon request, gives details con-
cerning weights and other data of tubing
and pipe, their working pressure scales,
and the bending operations used in forming.
Useful charts and engineering information.—
BOILER TUBE CO. OF AMERICA.

51 PACKAGED STEAM GENERATORS—Catalog 211—Describes and illus-
trates features of construction which con-
tribute to the high efficiency of Superior
steam generators. Gives details of capacity,
dimensions, operating data.—SUPERIOR
COMBUSTION INDUSTRIES, INC.

**56 SOLID ROTOR BACK PRESSURE
TURBINE**—Bulletin S-116—De-
scribes the Terry solid wheel rotor turbine
and its various applications particularly
those of back-pressure.—THE TERRY
STEAM TURBINE CO.

57 STEAM GENERATORS—Catalog—
Describes a wide line of steam
generators for all industry, up to 500,000
lb per hr and 500 psi with a great variety
of steam generation knowledge available for
consultation.—THE WICKES BOILER CO.

**68 OIL BURNERS FOR LIGHT OR
HEAVY OIL**—Bulletin 65—De-
scribes the standard Atomizer type "LAP" oil
burners to operate with light or heavy oil
under manual or automatic control, using
low air pressure for atomization. Wide firing
range in each of seven sizes.—NATIONAL
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76 GAS BURNER—Bulletin—De-
scribes the Reciprocating gas burner,
an application of the venturi principle which

provides high input through narrow rectangular openings for firing—in a horizontal plane through fire doors or small openings over grates, coal grates and stokers—
or for firing in a vertical plane on either side of stoker or oil burner.—THE WEB-
STER ENGINEERING COMPANY.

**83 STEAM GENERATORS & BOIL-
ERS**—Bulletin P-1, 6 pages, de-
scribes oil and gas fired steam gen-
erators for process and heating plants. Sizes 15 to
500 h.p.—15 to 260 psi. Complete installation
and performance information.—CYCLO-
THERM DIVISION, UNITED STATES RA-
DIATOR CORP.

85 COAL ANALYSES—Literature and
data sheets give complete analyses of available coals and individual
analyses of different types of coal.—BELL
& ZOLLER COAL CO.

95 DUST CONTROL—Booklet—De-
scribes how to increase production
reduce costs, safeguard workers' health
through the installation of tailored, adequate dust control systems, carefully designed to meet your needs.—LIBERTY
ENGINEERING & MFG. CO., INC.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

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tables for selecting units of right capacity
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EERS, INC. %

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for general industrial and institutional
service plants to give mechanical draft,
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perform various blowing and suction functions in process plants.—CLARAGE FAN
CO.

152 CONTINUOUS BOILER BLOWOFF
—Bulletin 2391—Explains why
boiler blowoff is necessary, how it can be
accomplished, and the amount of fuel saved
by the use of heat recovery equipment.—
THE PERMITT CO.

168 SEALS FOR PUMPS—Bulletin 49,
12 pages, describes the three types of
Byron Jackson mechanical seals for cen-
trifugal pumps—designed for sealing stuffing
boxes of pumps handling hot and cold liquids,
either corrosive or non-corrosive.—
BYRON JACKSON CO., PUMP DIV.

172 DESUPERHEATER—Bulletin 405—
Illustrates self-contained desuperheaters,
needing no expensive supplementary accom-
modation, piping and lines, no long runs of
straight piping, or special alloy piping. Accurate
temperature control, and the use of the
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DIV., CONTINENTAL FOUNDRY & MA-
CHINE CO.

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355 describes a complete line of
easy-to-read, vapor-pressure-actuated dial
thermometers, available with rigid stem for
use in pipes and tanks, or with flexible tubing for conveniently determining tempera-
ture at a point remote from dial.—
THE POWERS REGULATOR CO.



221 BOILER FEED CONTROL—Bu-
llentin 443-G is a condensed catalog of
various Copes feedwater regulators, pump
governors, pressure reducing valves, de-
superheaters, liquid level controls and bal-
anced valves.—COPES-VULCAN DIV., CON-
TINENTAL FOUNDRY & MFG. CO.

225 TEMPERATURE REGULATORS—
Bulletin 230 describes TR-21 which
provides gentle throttling control. For hot
water heaters, process or storage tanks, and
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automatic and self-operating.—SARCO CO.,
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**233 PROCESS INSTRUMENTS AND
CONTROLS**—Bulletin 17-C de-
scribes and illustrates some of the numerous
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from standard Bailey components for mea-
surement of temperature, pressure, flow and
level.—BAILEY METER CO.

TEMPERATURE REGULATORS

234 Bulletin 7-A—Describes self-con-
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for liquids and their comprehensive tempera-
ture regulations.—ATLAS VALVE CO.

238 SWITCH CONTROLS—Catalog No.
500-A—Gives complete information
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trols for various industrial requirements as
well as suggested applications.—THE
MERCOID CORP.

**257 AUTOMATIC STEAM PRESSURE
CONTROL**—Bulletin 462—Describes
the Leslie pressure controller for supplying
intermittent make-up to a low pressure system
from a high pressure line—positive, faithful.—
LESLIE COMPANY.

258 FEEDWATER CONTROL—Bulletin
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water level is actually controlled during
quick load changes, by the use of impulse
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**262 WATER COLUMNS, GAGES,
EQUIPMENT**—Brochure AO—In-
troduction to low pressure (0 to 250 psi)
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alarm water columns, and lists accessory
equipment.—RELIANCE GAUGE COLUMN
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MFG. CO., INC.

357 MODERN LUBRICATION — Bulletin — Describes methods of modernizing with Manual lubricators—pumps and compressors, wood and steel working machinery, process production and handling equipment.—MANTEL INC.

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403 VALVE OPERATORS, SPROCKET RIMS — Bulletin SB — Describes and illustrates adjustable sprocket rims with chain guides, and other forms of Babbitt valve operators and controls.—BABBITT STEAM SPECIALTY CO.

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ENGINES, DRIVES POWER TRANSMISSION MATERIAL HANDLING

604 CHAIN DRIVES FOR FRACTIONAL HORSEPOWER — Booklet 2010 — Lists applications of 3/16 in. pitch silent chain for fractional horsepower drives—gratings, dimensions, details.—LINK-BELT CO.

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608 BELT LACING, FASTENERS — Bulletin A-48 gives information on Alligator belt lacing for joining conveyor and transmission belts. Bulletin F100 covers Flexo belt fasteners which are used for fastening heavy duty conveyor and elevator belts.—FLEXIBLE STEEL LACING CO.

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Equipment and Review Editor

SOUTHERN POWER AND INDUSTRY

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11-52-1

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524	546	574	604	605	608	621	626	633	635	661	676	702	705	720	727
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B29	B30	B31	B32	B33											

Also send further information on following New Equipment (page 8)

N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 N14 N15 N16 N17 N18

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City Zone State

678 ELEVATING AND CONVEYING
—Circular—Describes
Farrell "S" elevating and conveying buckets made from durable cast steel to give economical elevator and conveyor bucket service, with a style and size for every need—belt type, double chain type, single chain type.—**FARRELL-CHEK STEEL COMPANY.**

**WATER TREATMENT, HEATING,
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CONTROL**

702 BOILER WATER TREATMENT—
Bulletin BM-929—Describes methods of applying treating chemicals to boiler feed water systems—illustrations of % proportioners, chemical feeding equipment with flowcharts of constant rate and flow responsive feeding systems.—**% PROPOTIONERS, INC.**

705 EXHAUST AND VENTILATING—
Bulletin D-84—Exhaust and ventilating manual describing the application and performance of Emerson electric ventilating equipment.—**THE EMERSON ELECTRIC MFG. CO.**

**720 WATER CONDITIONING HEAD-
QUARTER**—Bulletin 2293—Gives a brief description of all the equipment and processes and ion exchangers related to the field of water conditioning as available through Fermutite.—**THE FERMUTITE CO.**

**727 COLD PROCESS SOFTENERS AND
CLARIFIERS**—New bulletin describes high flow-rate reactors which maintain uniformly clear, soft effluent, regardless of variations in flow or impurities in raw water.—**GHAYMAR WATER CONDITIONING CO.**

780 CENTRIFUGAL REFRIGERATION—
—Circular C-100-B-14—Describes Worthington centrifugal refrigeration systems—cycles of operation, refrigerants, compressor design features, condensers, evaporators, controls, drives, etc.—**WORTHINGTON CORPORATION.**

788 STEAM HUMIDIFIER—Circular
1972 describes a complete line of steam humidifiers, including two new air controlled models. Discusses dry air problems, gives tables on desirable relative humidity and the regain of hygroscopic materials. Complete data on operation and installation.—**ARMSTRONG MACHINE WORKS.**

793 COOLING TOWERS—Catalog 145—
Describes C. H. Wheeler water cooling towers, designed to withstand wind velocities of 190 miles per hour—guaranteed performance with minimum water losses.—**C. H. WHEELER MFG. CO.**

ELECTRICAL

**833 BRONZE BEARINGS FOR MO-
TORS**—Catalog 146—Gives complete specifications of stock bronze bearings particularly intended for application to electric motors.—**THE BUNTING BRASS & BRONZE CO.**

835 POWER FACTOR CAPACITORS—
Catalog 100—Describes unit-cell capacitors for use—their power factor correction of electrical apparatus. Capacitor shunts are particularly well suited for industrial plants to relieve overloading of electrical power distribution systems. Typical applications shown.—**SPRAGUE ELECTRIC CO.**

12-52-8

Please send me without obligation, free booklets described in the December, 1952, issue of SOUTHERN POWER AND INDUSTRY as circled below:

14	18	25	26	30	46	48	51	56	57	68	76	83	85	95	102
122	152	168	172	220	221	225	233	234	238	257	258	262	300	325	347
350	357	371	403	404	409	421	423	430	443	481	485	501	505	507	510
534	545	574	604	605	608	621	626	633	638	661	676	702	705	720	727
760	768	793	833	835	837	840	861	901	910	957	959	992	810	811	812
B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28
B29	B30	B31	B32	B33											

Also send further information on following New Equipment (page 8)

N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 N14 N15 N16 N17 N18

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Equipment and Review Editor
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806 Peachtree St., N. E.
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837 ALUMINUM CONDUCTORS—Free Booklet, "Insulation Questions and Answers," discusses insulated aluminum conductors and their applications. Charts, diagrams, illustrations answer basic questions about conductor sizes, how handled, as actually installed, the details about joints and terminals.—**ALUMINUM COMPANY OF AMERICA**

840 MOTOR ACCESSORIES, **CON-**
TRACTOR—Catalog, 72 pages, gives complete information regarding switches, starters, contactors, relays, regulators, and various accessories for electric motors, complete with illustrations, condensed general data, dimensions, prices, etc.—**ALLEN-BRADLEY CO.**

861 FUSETRONS—Booklet gives complete facts on Buss fuses—**a combination fuse and thermal cut-out of low electrical resistance and high time lag—prevents shutdowns, saves maintenance costs.**—**MURMANN MFG. CO.**

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

**901 CENTRIFUGAL BLOWERS AND
EXHAUSTERS**—Bulletin A-544, 12 pages, describes the design features and the applications of Hoffman multi-stage centrifugal blowers. Capacity tables, work data and handy information included.—**U. S. HOFFMAN MACHINERY CORP.**

910 WELDING AND BRAZING ALU-
MINUM—A booklet, "Welding and Braze Alcoa Aluminum"—Gives complete information on Tungsten-Argon welds, very successful in ever-increasing practice. Other types of welding and braze aluminum.—**ALUMINUM COMPANY OF AMERICA**.

**957 ROTARY DUMPERS FOR MINE
AND RAILROAD CARS**—Booklet 2048-A—Describes and illustrates rotary railroad car dumpers, capable of unloading open-type railroad cars at the rate of 1½ min. to a full cycle of dumping and return.—**LINK-BELT CO.**

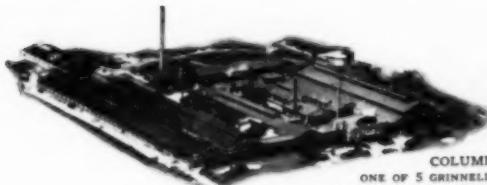
959 THERMAL INSULATION—Chart 959 IN-4B, 11½" x 18", suitable for hanging on the wall, shows at a glance the recommended insulation for every temperature range from -40°F to plus 800°F.—**JOHN MANVILLE CORP.**

992 FIRE PROTECTION—Bulletin 2219 describes Blaw-Knox Deluge systems, wet and dry pipe sprinkler systems, water mist systems, fire detection systems, fire alarm systems, etc., and indicates how a sprinkler system pays for itself out of insurance savings.—**BLAW-KNOX SPRINKLER DIV., BLAW-KNOX CONSTRUCTION CO.**

Continued on page 146

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Tear Out and Mail
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Attached Cards
Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.



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MANUFACTURING PIPE FITTINGS

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complete-line manufacturer of high quality PIPE FITTINGS

offers you...



- Complete line of high quality malleable iron and cast iron pipe fittings.
- Large stocks of pipe fittings — mass-produced by skilled workers using modern equipment.
- Dependability — the result of finest materials, equipment and methods; assured by rigid production control and triple inspection.
- Coast-to-coast network of branch warehouses and distributors — making available local stocks of Grinnell pipe fittings.

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GRINNELL MALLEABLE FITTINGS IN CARTONS

Grinnell malleable iron fittings are available in cartons at no extra cost. Cartoned fittings offer you:

- Faster and cleaner handling.
- Easier storage and shipping.
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- Contents quickly identified by labels.
- Greater accuracy in ordering.

Grinnell malleable fittings are also available in both small bags and large bags.



Dimensional accuracy assured by finest equipment and modern methods of mechanized molding.



Smooth inside finish obtained by the use of the best core sand and the employment of superior core making equipment.



Superior metal, poured into molds on continuous conveyors, gives Grinnell pipe fittings extra strength . . . extra ruggedness.



Accurate chamfer and precision threads, produced by modern tapping machines, provide easy starting and tight joints.

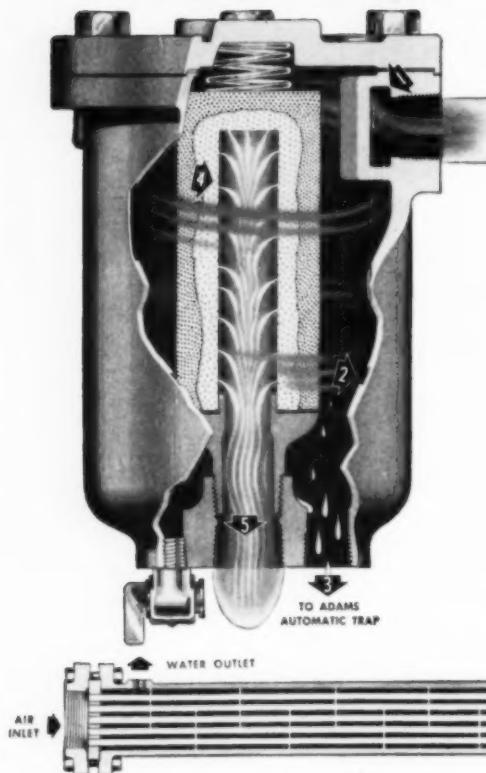


Grinnell Company, Inc., Providence, Rhode Island

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermalier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

ADAMS

has both *



*AFTERCooler AND CYCLONE SEPARATOR

Cools air to within a few degrees of cooling water, making certain that compressed air is colder than surrounding atmosphere, so that no further condensation can take place.

Counter flow, air-through-tube design assures continuously high heat transfer rate. Double cyclonic action deposits all water and entrained oil in moisture chamber.

R. P. ADAMS CO., INC.
247 E. Park Drive, Buffalo 17, New York
Please send me your latest literature. Bulletin No. 176 on BOTH the Poro-Stone air filter and the Adams Aftercooler — Cyclone Separator.

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Company _____ Title _____

Address _____

City _____ State _____



BOTH ANSWERS TO THE PROBLEM OF KEEPING WATER, WATER VAPOR, OIL AND DIRT OUT OF COMPRESSED AIR LINES

There's no *one* answer to this problem! The most expensive aftercooler you can buy will not remove scale that is picked up in the distribution lines. The most expensive air filter you can buy cannot guarantee removal of water vapor until it has been condensed by cooling. That's why Adams makes both.

* Poro-Stone Air Filter

1. Centrifugal separation of dirt and liquids.
2. Drainage to trap directed by vertical cast-in slots.
3. Continuous, fully automatic trap action.
4. Rapid diffusion and filtration through permanent, cleanable Poro-Stone.
5. Clean, dry air at practically unchanged pressure. Standard, stocked sizes handle from 10 to 700 cfm.

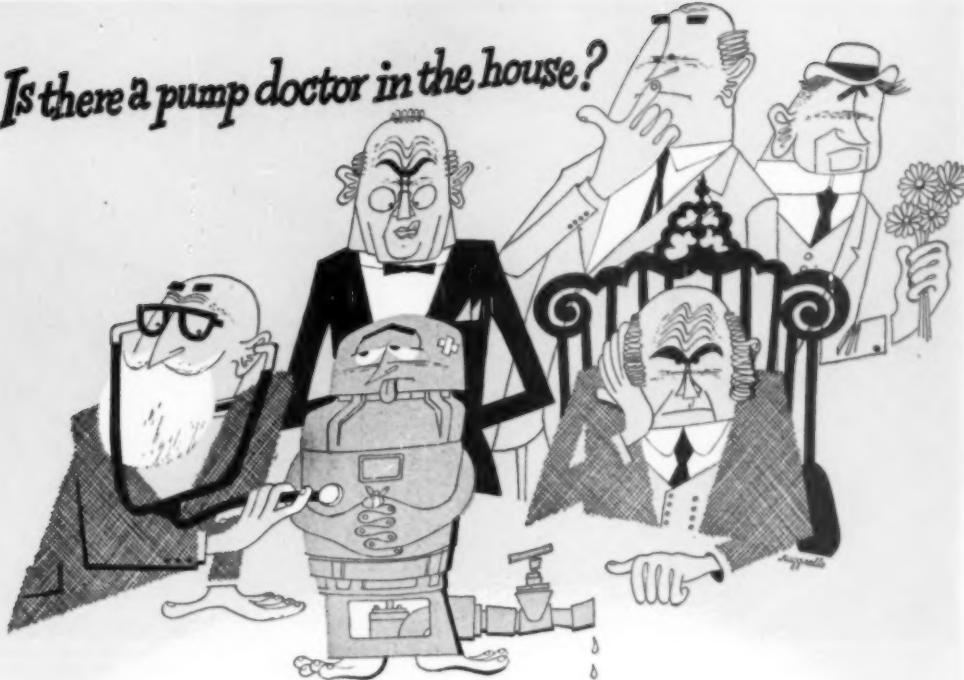
Easily installed in either vertical or horizontal pipe line.



FOR YOUR PROFIT'S SAKE
— FIND OUT ABOUT BOTH

R. P. ADAMS CO., INC., BUFFALO 17, N. Y.

Is there a pump doctor in the house?



YES... THERE'S A BJ PUMP SPECIALIST A FEW MILES OR MINUTES FROM YOU!

If you have a sick pump—or if you're having trouble diagnosing a pumping problem, a BJ pump specialist can help. These fully-qualified BJ Sales Engineers, working out of 31 *company* sales offices, bring you the benefit of BJ's 80 years' experience in meeting and solving every kind of pumping problem. These local Byron Jackson offices are in addition to BJ's six modern factories, six service shops, and reliable dealers. For pump engineering assistance and quick answers to your particular pumping problems, just phone your nearby BJ Branch Sales Office!



Byron Jackson pump manufacturing plants are located in Los Angeles and Fresno, Calif.; Houston and Plainview, Tex.; Lawrenceburg, Ind.; and Bethlehem, Penn.

In addition, BJ Service Shops are operated in Chicago Heights, Ill.; Chico and Lodi, Calif.; Casa Grande and Phoenix, Ariz., and Lubbock, Tex.

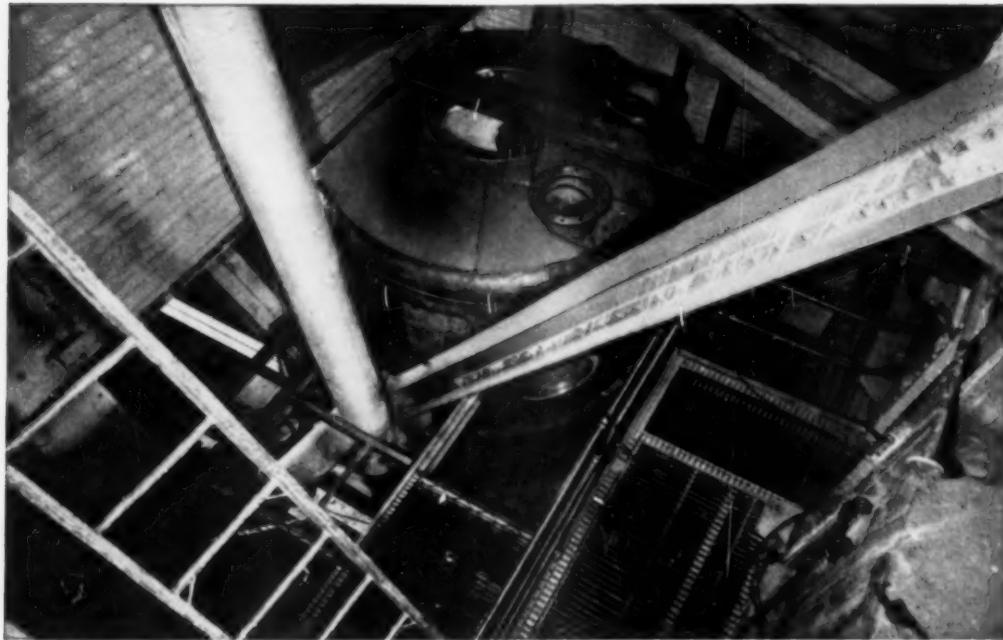
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Byron Jackson Co.

Since 1872

P.O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

Offices in Principal Cities



STAINLESS STEEL DEAERATING TANK is hoisted in place during construction of one of Detroit Edison Company's Heating Plants at Detroit, Michigan.

When CO₂ Caused a Headache ...Worthington Cured It

Detroit Edison had the solution to its problem—the problem of CO₂ in its steam—except for one thing.

Zeolite-softened municipal water used in their steam plant contains high percentages of carbonates which decompose and generate CO₂ in the boilers. Carried over with the steam into heating and processing equipment, that CO₂ could cause plenty of trouble.

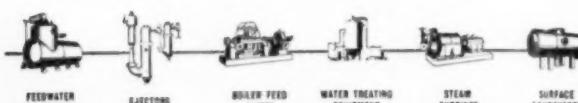
The CO₂ problem was solved by Detroit Edison engineers by acid treating the softened water, converting the carbonates to CO₂. The gas thus formed is driven off in a deaerator.

However, no standard deaerator could successfully remove the large quantities of CO₂ released by the acid treatment, and deliver water to the boiler with practically zero oxygen and zero CO₂. Furthermore, standard materials would have lasted only a few months under such conditions.

NON-CONTAMINATED STEAM

Worthington provided the answer. Detroit Edison engineers selected a Worthington deaerator specially designed for these severe conditions, built entirely of stainless steel, and guaranteed to deliver water containing not over 0.005 ppm of oxygen and not over 0.1 ppm of CO₂. The result is steam containing so little CO₂ that the amount cannot be accurately measured!

On problems like this one, Worthington not only furnishes all of the equipment needed in a complete water treating installation, but also has the engineering ability to work with your engineers on the complete problem of generating steam for power or processing. For further information on why there's more worth in Worthington, address Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Steam Power Division, Harrison, New Jersey.

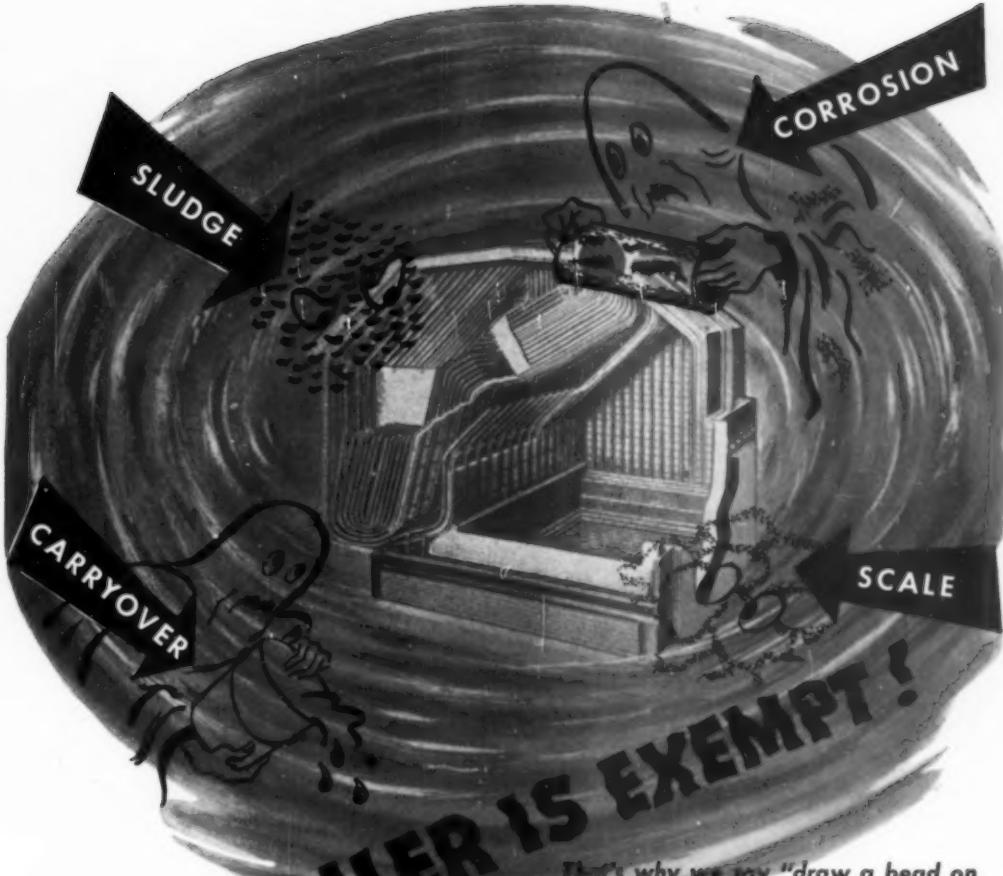


A GREAT TEAM IN STEAM

WORTHINGTON

Feedwater Heaters

S 12



*That's why we say "draw a bead on
boiler sludge, scale, corrosion and carryover"*

Tube failure, expense and inconvenience . . .
even plant shut down await those who ignore these
potential difficulties in their boiler operations.

Call in the Drew Engineer for thorough investigation,
specific recommendations, proper treatment and frequent
follow-up service that will clear up your boiler troubles
or stop them before they start.

Write for the new booklet "Drew Boiler Water Treatment"
describing methods used in overcoming boiler water problems.



Power Chemicals Division

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SOUTHERN POWER & INDUSTRY for DECEMBER, 1952



"We Tested Them and Found That **Fusetron** DUAL ELEMENT Fuses actually Do Prevent Needless Shutdowns"

H. L. Walker, Chief Electrician
American Insulated Wires and Cables Co.
Paramus, New Jersey



You too can profit
by Mr. Walker's
Experience



By taking advantage of the 10 POINT PROTECTION of FUSETRON Dual-Element Fuses

- 1 Protect against short-circuits.
- 2 Protect against needless blows caused by harmless overloads.
- 3 Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation.
- 4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.
- 5 Protect motors against burnout from overloading.
- 6 Protect motors against burnout due to single phasing.
- 7 Give DOUBLE burnout protection to large motors — without extra cost.
- 8 Make protection of small motors simple and inexpensive.
- 9 Protect against waste of space and money — permit use of proper size switches and panels.
- 10 Protect coils, transformers and solenoids against burnout.

*Fusetron Fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.



"We have a 3 phase, 3 circuit switch panel controlling a resistance type heat treating furnace. In this switch we formerly installed nine 600 amp. 250 volt renewable fuses.

"These fuses, however, heated excessively and were blowing as often as once a day. To stop these blows we even tried out using 800 ampere links but it didn't do any good. We still had fuses blowing.

"As a test we installed three 600 amp. Fusetron Fuses in one circuit. That was in May, 1947.

"The first and only blow we had on these Fusetron fuses was in April 1948—one year later. This blow was apparently caused by the heating of the ordinary fuses in the other two circuits.

"The shutdown caused by this blown Fusetron fuse woke us up to the fact that the test we had made proved that Fusetron dual-element fuses actually do prevent needless shutdowns.

"Since then we have used only Fusetron fuses in this switch and our needless shutdown troubles have disappeared."

H. T. Walker, Chief Electrician
Crescent Insulated Wire and Cable Company
Trenton, New Jersey

*Don't Risk Losses
in Your Plant*

Delay may cost you more than replacing every ordinary fuse with a FUSETRON dual element Fuse — but by passing the word along that all purchase and stock records should call for FUSETRON dual element fuses, you have action that begets money saving.

SEND THE COUPON FOR MORE FACTS



FUSETRON
TRUSTWORTHY NAMES IN
ELECTRICAL PROTECTION

BUSS

BUSSMANN Mfg. Co. (Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo.

Please send me complete facts about FUSETRON dual-element Fuses.

Name _____

Title _____

Company _____

Address _____

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1152

M.I.T., famous engineering school, uses WICKES boilers for steam production

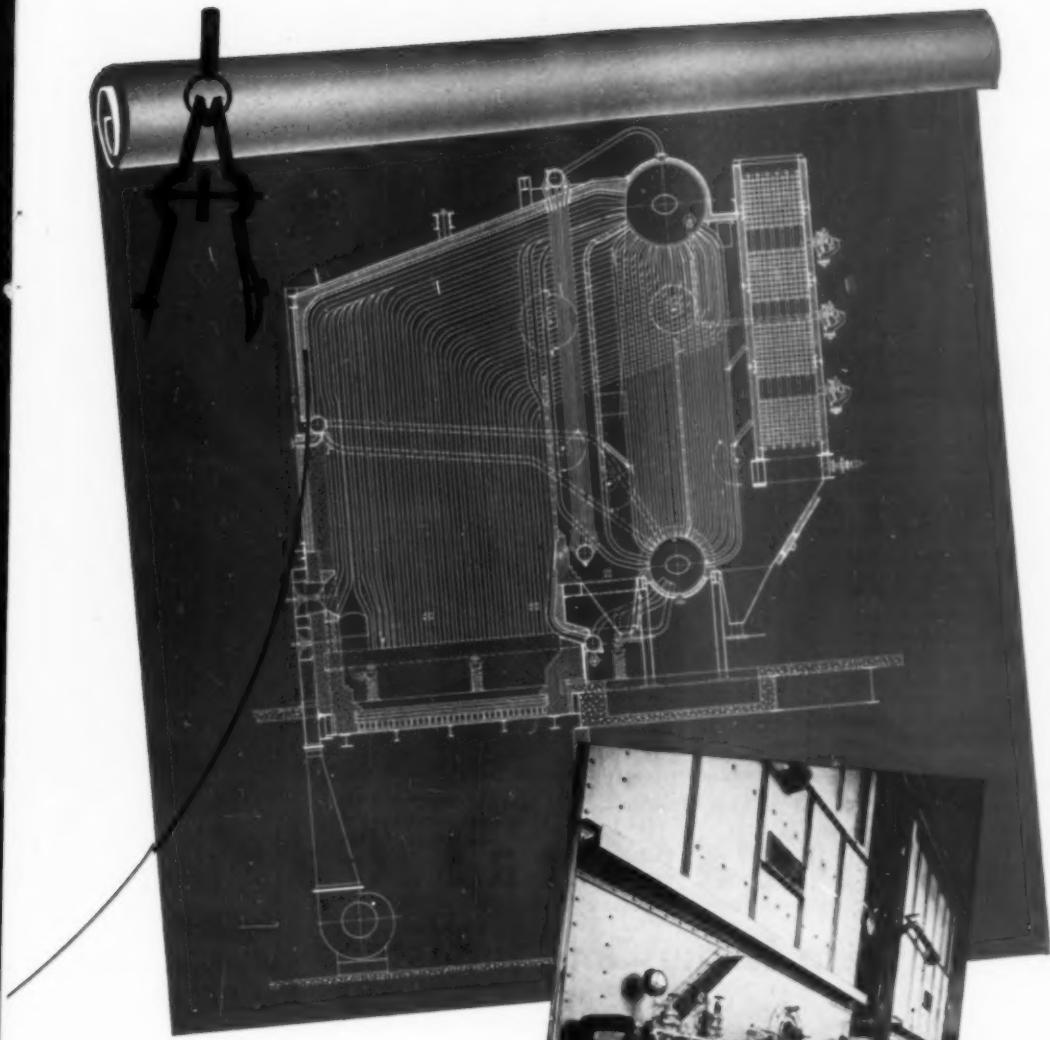
Consultants — JACKSON & MORELAND, ENGINEERS of Boston, Mass.



AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, where sound engineering principles are taught, two Wickes Steam Generators were selected to supply heat for several new buildings including the Hayden Library and Sloan Metals Research Laboratory. The Wickes Boilers, which were custom-engineered for M.I.T., produce 160,000 lbs. of steam per hour. They occupy the same space formerly occupied by the two old boilers that produced only 40,000 lbs. per hour. They are equipped with superheaters and economizers. The new boilers are oil-fired at present but are engineered for ready conversion to spreader stoker if desired. They are designed for quick steaming to meet emergency power requirements and are fitted with thermowells and openings for taking flue gas samples so the students at M.I.T. can run boiler tests as part of their instruction. The installation of these boilers, an extremely difficult job because of the close erection tolerances, was handled by Flagg, Brackett & Durgin, Inc., Wickes' agents in Boston.

Wickes can fill your requirements for steam generators up to 250,000 lbs. per hour and 1000 psi.—all types of multiple drum boilers adaptable to any standard method of firing; oil, gas, underfeed or spreader stoker. Write today for descriptive literature or consult your nearest Wickes representative.

RECOGNIZED QUALITY SINCE 1854



ABOVE: Blueprint diagram of one of
the Wickes Steam Generators at M.I.T.

RIGHT: View showing the two Wickes
Boilers installed in the power plant at
M.I.T.



WICKES

THE WICKES BOILER CO.

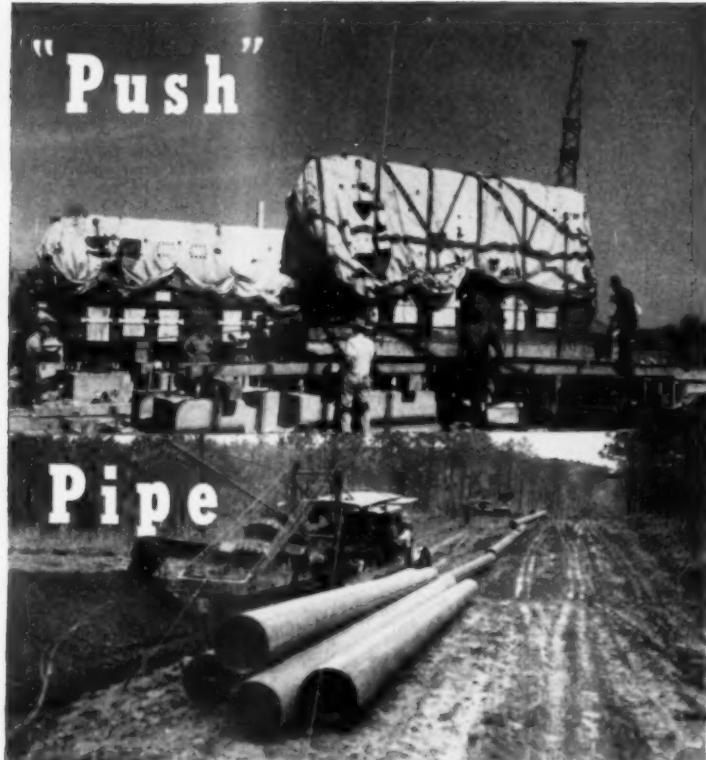
DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

SALES OFFICES: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Greensboro, N.C. • Houston •
Indianapolis • Los Angeles • Memphis • Milwaukee • New York City • Pittsburgh • Portland, Ore. • Saginaw • Springfield, Ill. • Tampa, Fla.
• Tulsa • Washington, D.C.

142

More

"Push"



More

Pipe

More Natural Gas For Southern Homes and Industries

Powerful new compressors and many more miles of big steel pipe are now bringing increased supplies of this "perfect fuel" to Southern users.

Plans now before regulatory authorities and still on the drawing boards look forward to increasing deliveries of natural gas.

**SOUTHERN NATURAL GAS
COMPANY**

Watts Building

Birmingham, Ala.

A STEAM TRAP CASTS A MIGHTY BIG SHADOW!



THINGS STEAM TRAPS AFFECT	REASON	HOW ARMSTRONG TRAPS MEET THE NEED	EXAMPLE
1 HEAT-UP OR START-UP-TIME	When steam is turned on, large amounts of condensate and air must be removed.	Condensate and air are discharged as fast as they reach trap.	40 Minutes Faster Heat-up of drying oven at pharmaceutical plant with Armstrong "Blast" traps.
2 RATE OF PRODUCTION	Quick heat-up, maximum temperatures essential for maximum output.	Air and condensate discharged at steam temperature; equipment kept full of hot, dry steam.	30% Greater Output from jacketed kettles at Canadian plant since changing to Armstrong traps.
3 STEAM WASTE	When steam gets past traps, fuel is wasted, boiler capacity may be inadequate.	No steam ever reaches discharge orifice, even when there is no condensate load. Heat treated chrome steel valve parts, ground and lapped, resist wear, stay leak-tight for a long time.	Steam Savings Eliminate Need for New Boiler at chemical plant since installing Armstrong traps.
4 FUEL WASTE	Steam that blows through traps does no useful work, wastes fuel.	Steam that blows through traps does no useful work, wastes fuel.	33 1/3% Reduction in Fuel Bill after trapping vats with Armstrongs at Missouri plant.
5 CONTINUITY OF OPERATION	When traps are inoperative or down for repairs, unit being drained may be "off the line."	Nothing to clog, stick or collapse! Large orifice. Self-scrubbing action cleans out dirt, scale. "Frictionless" leverage, heavily reinforced. Wear and corrosion-resistant stainless trim.	Maintenance Time Cut 30% Illinois user says, "Unequalled dependability, simplicity of design means repairs can be made quickly" (with minimum equipment downtime).
6 MAINTENANCE COST	Traps that don't "wear well" take a lot of manhours for repair.	Traps that don't "wear well" take a lot of manhours for repair.	

BIG effects from little traps! And, the effects are multiplied by the number of traps in the plant you design or operate until they grow to be a major influence upon operating efficiency and economy.

ARMSTRONG MACHINE WORKS • 806 Maple St., Three Rivers, Mich.

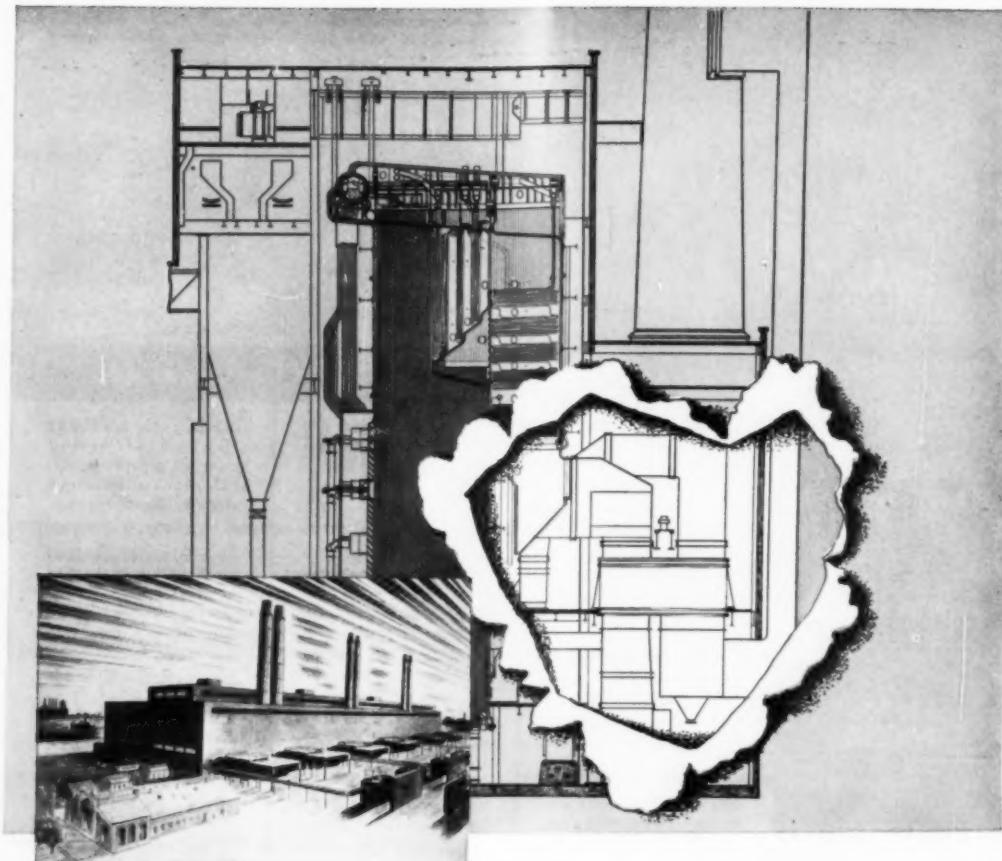
Before you specify steam traps ask your nearby Armstrong Representative to call. He is qualified to give you practical assistance and answers that can save you a lot of time and trouble.

SEND FOR CATALOG

The 44-page Armstrong Steam Trap Book gives complete data on trap operation, selection, installation, maintenance, safety factors, etc. Free on request . . . Write:



ARMSTRONG STEAM TRAPS



Reheat Boilers at Astoria Station of the Consolidated Edison Co. of New York, Inc.

equipped with

LJUNGSTROM

AIR PREHEATERS

As part of its immense expansion program, Consolidated Edison Company of New York will place its new Astoria Station in service in the early spring of 1953. Ultimately to have a capacity of 1,000,000 kilowatts, the station's first unit will generate 180,000 kilowatts, with a duplicate unit to follow in a few months.

Astoria Station was designed by the staff of Consolidated Edison, and is being built by various contractors. Its 160,000-kw (nameplate rating) turbine-generators each will be powered by a Babcock & Wilcox reheat boiler, rated at a continuous capacity, coal fired, of 1,200,000 pounds of steam per hour at 1850 psi and 1000 F., reheated to 1000 F.

Each boiler at this huge new station will be serviced by two Ljungstrom Air Preheaters, which will preheat incoming air to approximately 560 F., and cool exit gases to 250 F.

Once again—as is the case with millions of kilowatts of generating capacity all over the country—the Ljungstrom Air Preheater was selected for high-performance steam generating equipment. The unanimity with which the Ljungstrom has been chosen—by utilities... by industry... by consultants... by boiler manufacturers—for efficient steam generating units can be your guide, too, to steam generation with top fuel economy.

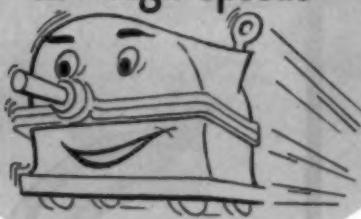
THE AIR PREHEATER CORPORATION, 60 East 42nd Street—New York 17, N. Y.

*Better gear protection
when you need it! **

-GULF E. P. LUBRICANTS



2.* **high speeds**

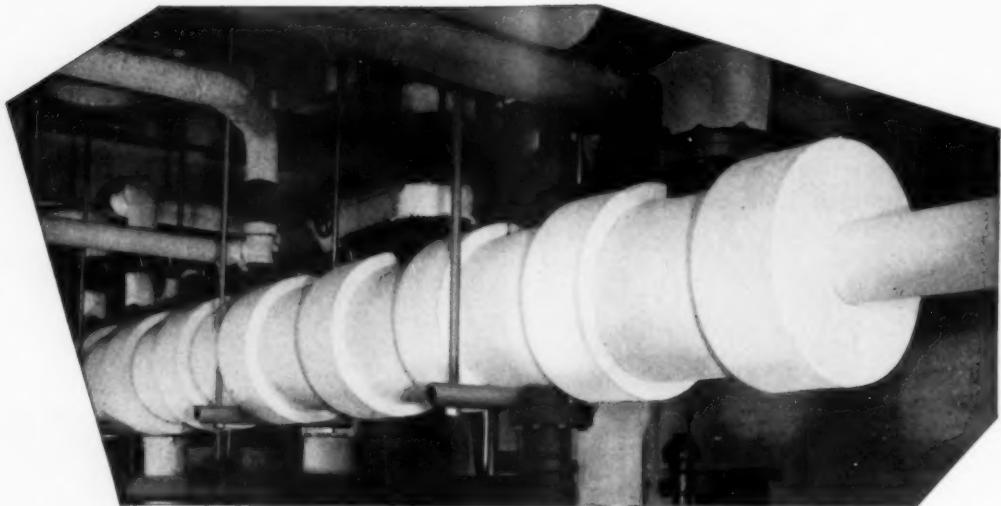


With Gulf E.P. Lubricants you get extra protection against gear troubles when production demands call for a speed-up of equipment or when unusually heavy tooth loads are developed. They are specially compounded to prevent metal-to-metal contact and help protect against pitting, spalling, and excessive wear.

For specific recommendations for your equipment, call in a Gulf Sales Engineer today. Write, wire or phone your nearest Gulf Office.

Gulf Oil Corporation • Gulf Refining Company
Pittsburgh 30, Pa.





**MAKE TOUGH JOBS EASY
WITH EASY-TO-USE**
UNIBESTOS[®]
PIPE INSULATION

Ask any user about Unibestos! He'll tell you how easily this good insulation is cut and fit on-the-job, for Unibestos is light, strong, firm—saws cleanly for tight joints—retains initial high efficiency. It is unaffected by service hazards.

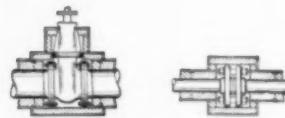
Whether you specify Unibestos No. 1200 (for temperatures up to 1200°F.), Unibestos No. 750 (for temperatures up to 750°F.), or Amocel for commercial uses (temperatures up to 600°F.), you'll always save in two ways: (1) quick and simple application; (2) long-lived durability. Your Unarco Distributor can supply you quickly from his stocks of these pipe insulations. Also available in block form for temperatures up to 1200°.

For details on these insulations, ask for Bulletin No. 76-109.



*Write or call
332 Candler Building
Atlanta, Georgia
Telephone Lamar 7113*

**SEE HOW THESE TYPICAL
APPLICATIONS ARE SIMPLIFIED**



Unibestos pipe insulation is particularly adaptable for insulating irregular surfaces such as flanges, valves, and fittings. Its firmness and easy-to-fit characteristics make such jobs easy; save time.



Unibestos pipe insulation and block can be used separately or in combination for insulating nested and traced lines quickly and economically.



For insulating pipe bends Unibestos can be mitered easily, and cemented-in with Unarco No. 50 insulating cement.

UNION ASBESTOS & RUBBER COMPANY



DEPT. F-12, 332 SOUTH MICHIGAN AVENUE, CHICAGO 4, ILLINOIS

**For Features that
Mean Long Valve Life
and Low Cost Service
Get this
ALL-Purpose
Edward
Forged
Steel
Globe
Valve**



Edward
Fig. 444-448
series, built in sizes
½ to 2 in. inclusive
... forged steel globe
and angle ... 600 and
1500 lb sp ... bolted or
union bonnet ... screwed or
socket welding ends ... Fig.
448 illustrated.

Big
CHECK THESE FEATURES

- ✓ Hard bronze yoke bushing to prevent stem seizing or galling ... lock welded to yoke
- ✓ Packing is Edward EVAlpak ... heat resistant, water-proofed and die molded for long service
- ✓ Disk of EVAlloy 13% chromium or Stellite ... slotted or disk nut type ... self centering
- ✓ Tight, easily accessible bolted or union bonnet joint ... with Irakote gasket of 90 Brinell max. hardness for leak-proof joint
- ✓ Heat treated forged steel inclined stem globe type body for lowest pressure loss
- ✓ Built-in pressure-tight backseat ... permits repacking under pressure
- ✓ Roomy forged yoke ... plenty of finger space for repacking
- ✓ Strong forged gland bolts ... plated for long thread life

Edward Valves, Inc.
122 West 144th Street, East Chicago, Indiana.

Please send literature covering your Fig. 444-8 series
all-purpose forged steel valves.

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Company _____

Position _____

Address _____

City _____ Zone _____ State _____


Edward Valves, Inc.

Subsidiary of **ROCKWELL MANUFACTURING COMPANY**
EAST CHICAGO, INDIANA

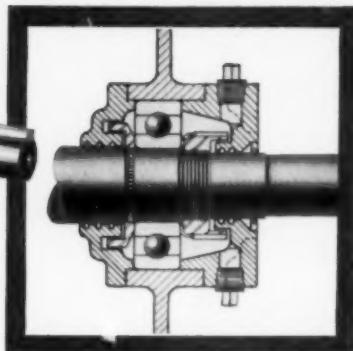
Wagner

ELECTRIC MOTORS
...the choice of leaders
in Industry



Wagner

STEEL FRAME MOTORS



This sealed-bearing motor can be lubricated

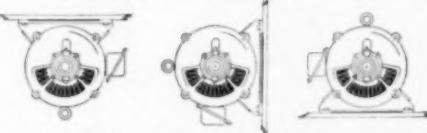
Wagner Steel-Frame general purpose polyphase motors are equipped with labyrinth sealed bearing housings that effectively prevent the entrance of any dirt or grit that might cause premature wear. It is not necessary to lubricate the bearings—motors in the smaller frame sizes operate for years without relubrication. But...these Wagner Motors are provided with two lubrication openings—you *can* lubricate your motors when necessary or desirable, to add years of useful motor life in unusually severe applications.

Wagner's Bulletin MU-131 gives valuable information concerning proper lubri-

cation of electric motors—Copies will be sent you on request.

DRIP-PROOF...3 WAYS

These open-type motors [in frames 326 and smaller] are completely drip-proof in any horizontal position because there are no openings in the frame and the end-plates can be rotated 90° or 180° for drip-proof installation



in ceiling or sidewall horizontal positions, as well as in the normal horizontal position.

Wagner Steel-Frame Motors are available in electrical types to meet most industrial requirements. Bulletin MU-185 gives full information—write for your copy.



WAGNER ELECTRIC CORPORATION
6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS • AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES



If better valves
could be made,
POWELL would make them

This is no idle boast because, for more than a century, Powell has been satisfying the demands of industry for the best valves it is possible to produce. As a result, Powell Valves have an enviable reputation for dependable service, long life and minimum maintenance.

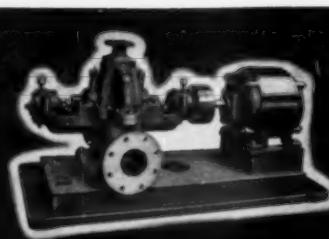
The Wm. Powell Company
Cincinnati 22, Ohio

WARREN...the most complete line of industrial pumps available from one source

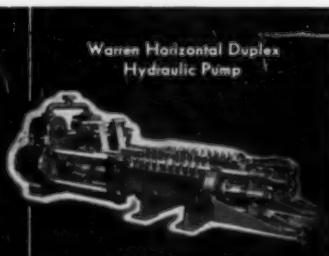
CENTRIFUGAL • RECIPROCATING • SCREW • ROTARY



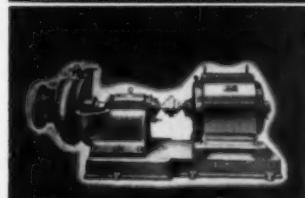
Warren-Quimby
Gear-in head Screw Pump



Warren Condensate Pump



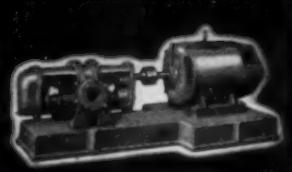
Warren Horizontal Duplex
Hydraulic Pump



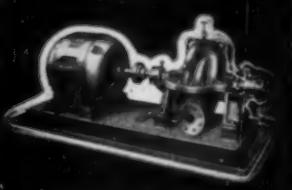
Warren Type "L" Single-Stage
Single-Section Liquid Pump

There's a Warren or Warren-Quimby Pump for practically all industrial pumping applications, and our large variety of types and sizes assures an unbiased recommendation. The value of this should not be underestimated because a recommendation that barely meets operating conditions and requirements can prove to be anything but a profitable long range investment, regardless of any initial advantage in cost.

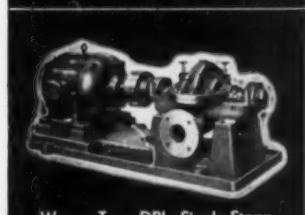
It will pay you to check with Warren on your next pumping job.



Warren-Quimby External Gear
and Bearing Rotex Pump



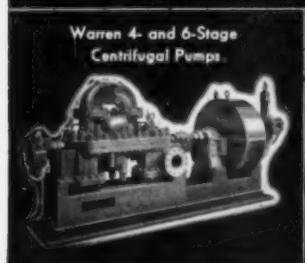
Warren Two-Stage Volute
Centrifugal Pump



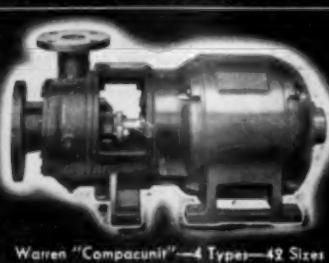
Warren Type DBL, Single-Stage
Double Suction, Centrifugal Pump



WARREN STEAM PUMP COMPANY, INC.
WARREN, MASSACHUSETTS



Warren 4- and 6-Stage
Centrifugal Pumps

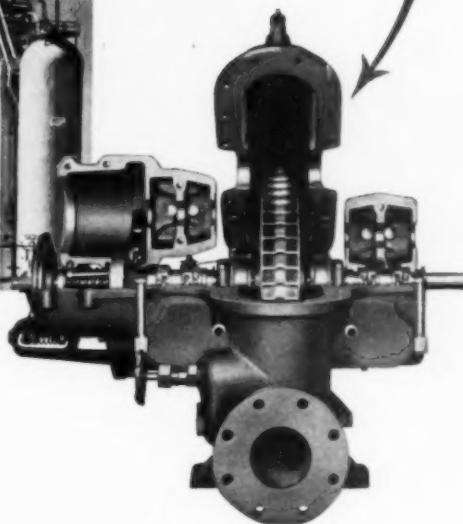
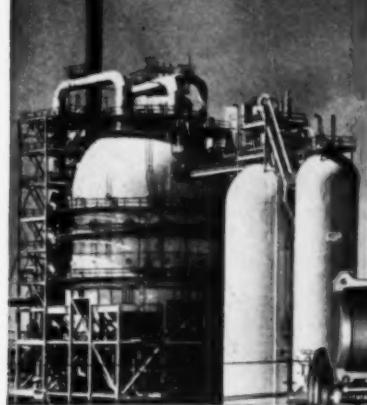


Warren "Compacunit" - 4 Types - 42 Sizes



Warren Horizontal "Realwear"
Duplex Piston Pump

REFINERY has 101 ways to save money



When the yearly cost of replacement parts for 101 steam turbines averages only 1.6% of the initial investment, you are saving money . . . and plenty of it.

This amazing record was established by Terry turbines at a large refinery on the Atlantic coast. The percentage figure was determined by means of an accurate tabulation of the cost of replacement parts required over a two-year period.

These 101 Terry machines provide a good cross section of the various types of small and medium-size turbines made by the company. Ranging in size from 10 to 1200 horsepower,

they include single and multistage axial flow designs as well as the famous Terry solid-wheel turbine.

Such outstanding performance records are not at all unusual for Terry turbines. The thousands and thousands of these machines installed in refineries throughout the world provide an accurate yardstick for measuring turbine reliability.

Send for illustrated bulletins. No. S-116 describes the many advantages of the Terry solid-wheel turbine. For multi-stage turbines, ask for a copy of Bulletin S-146.

TERRY

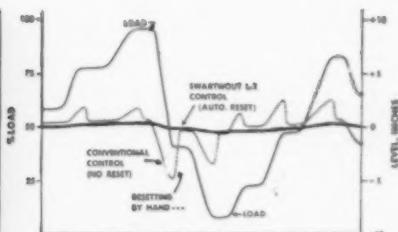
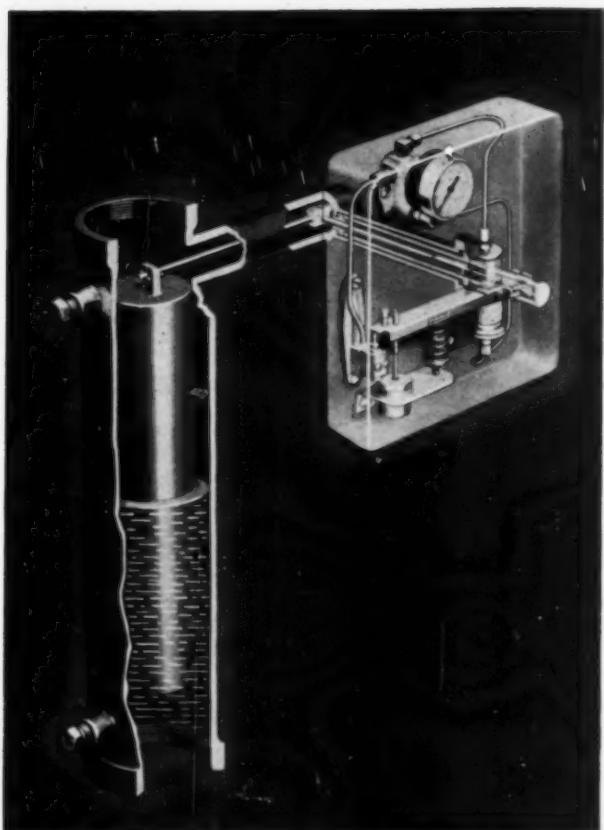
THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TT-1194



Through advertisements like the one above, placed in national magazines and financial newspapers, the Southern Railway System regularly invites industries to "Look Ahead — Look South" for greater opportunity. And every new factory that "comes South" means more jobs . . . more business for local merchants . . . more dollars to spread across Dixie and into our homes — and more traffic for the Southern.

Hold liquid levels within $\pm \frac{1}{2}$ inch automatically with Swartwout L1 Displacement Type Controls



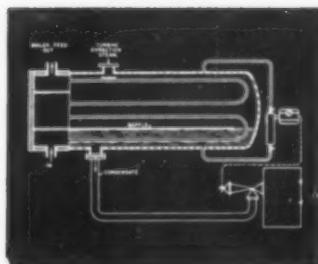
1 Precise control of liquid level from no load to full load without manual readjustment is provided by Swartwout L1 Controls. Setback and reset features compensate for quick-changing loads or long process lags . . . eliminate any tendency to cycle or hunt, yet permit control within narrow range of $\pm \frac{1}{2}$ inch. Graph (above) shows precision of L1 compared with conventional control on applications where level must be maintained within $\pm \frac{1}{2}$ inch.

Operating on balance of forces principle, there is little actual movement of parts. Torque tube design eliminates stuffing boxes . . . gives continuous leakproof operation. Since changes in liquid level vary effective weight of displacement type float, L1 Controls can also be used for throttling over full length of float, available in lengths from 15 to 120 inches.

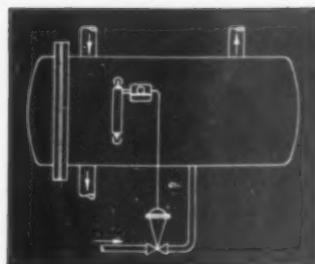
A-3096

Swartwout

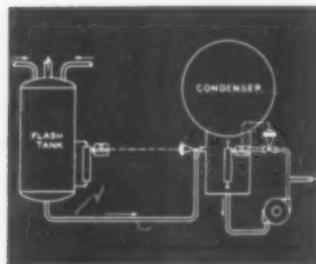
POWER PLANT EQUIPMENT



2 Horizontal Subcooled Heaters—L1 Control holds level to $\pm \frac{1}{2}$ inch, never lets condensate cover tubes that should be exposed to steam . . . never exposes tubes that should be covered with condensate.

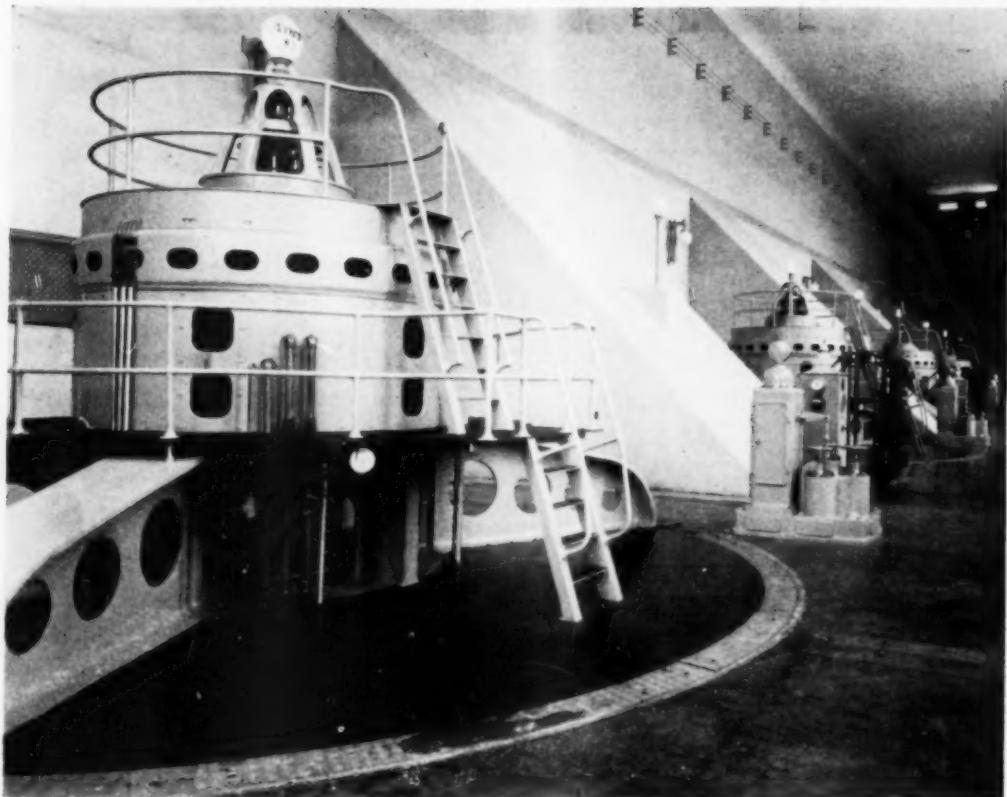


3 Evaporators—Swartwout L1 Displacement Type Control holds level within $\pm \frac{1}{2}$ inch . . . prevents carryover of solids and contamination of boiler feed water. Increased plant efficiency results.



4 Flash Tanks—Level maintained, in some installations, by L1 Control draining to condenser. Hot well level precisely maintained by controlling condensate recirculation from pump discharge.

SEND FOR BULLETINS S-15-A, S-208-A • THE SWARTWOUT COMPANY, 18511 EUCLID AVENUE, CLEVELAND 12, OHIO



Preventive Maintenance

IN TURBINE OPERATION there are many conditions which influence the performance of the turbine oil. And in no other phase of lubrication is there such a great need for preventive maintenance—selecting the proper oil is of vital importance. Factors to be taken into consideration are correct body, high film strength, high chemical stability, great separating ability and anti-rust properties. Standard Oil turbine oils are noted for possessing each of these qualities. They are refined by the most modern methods from specially selected crudes, assuring high

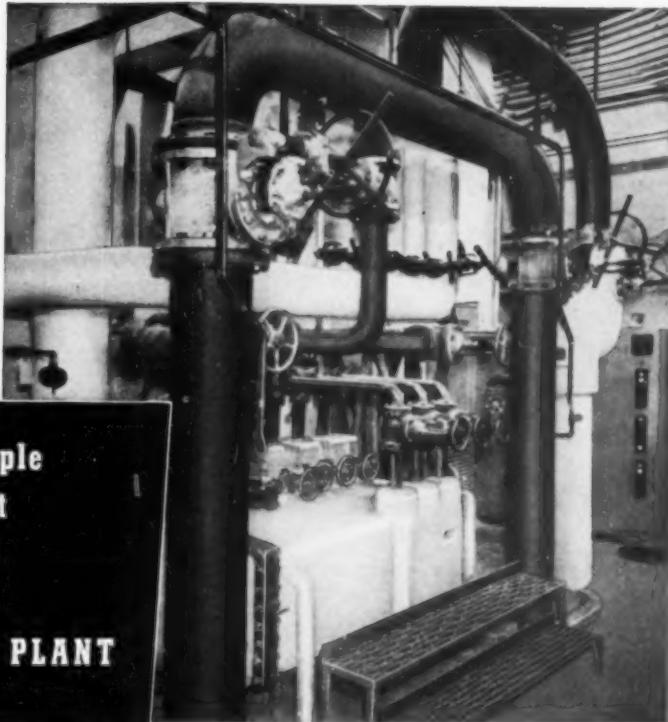
resistance to oxidation and ability to maintain body under the severest conditions. To solve your lubrication problem, consult a Standard Oil representative. His constant contact with power industry, backed by the world's largest combined facilities for research, testing and engineering of petroleum products, offers you the finest service available.

**STANDARD
OIL**
LUBRICANTS

Standard Oil Company
(KENTUCKY)



**How CONSECO Triple
Element Steam Jet
Air Ejectors Help
Trim Costs at . . .
HARBOR STEAM PLANT**



CONSECO service is available for designing, manufacturing and installing Steam Jet Air Ejectors for all requirements of the power, chemical and process industries . . . Write for a copy of our new Engineering Bulletin No. 103, describing Conseco Ejectors in detail and giving valuable technical information

**SEE US AT BOOTH 76
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**CONSECO LINE
INCLUDES:**



DEAERATORS



CONDENSERS



CLOSED HEATERS



EVAPORATORS

THESE triple element, two-stage Conseco Air Ejectors constitute parts of units No. 3, 4 and 5 which are installed in the Harbor Steam Plant, Los Angeles, California. Each ejector operates with steam at 400 psig, 850 deg. FTT and serves a twin 70,000 sq. ft. Conseco Condenser handling a 75,000 kw turbine



"...and be sure to
specify **HAGAN**
AUTOMATIC
COMBUSTION CONTROLS
because you get...

...reliable performance, and dependable accuracy."

Rugged and accurate, Hagan Combustion Controls are the best you can buy . . . and there is good reason why you should buy only the best.

Waste as little as one per cent of the fuel burned by your boiler during its life, and the cost of the wasted fuel can equal five, or six, or even seven times the original cost of the control system.

That is why you cannot afford anything less than the best—dependable Hagan Combustion Controls.

Our engineers will be glad to discuss all types of combustion control applications with you. For full information, wire, write or call

HAGAN CORPORATION

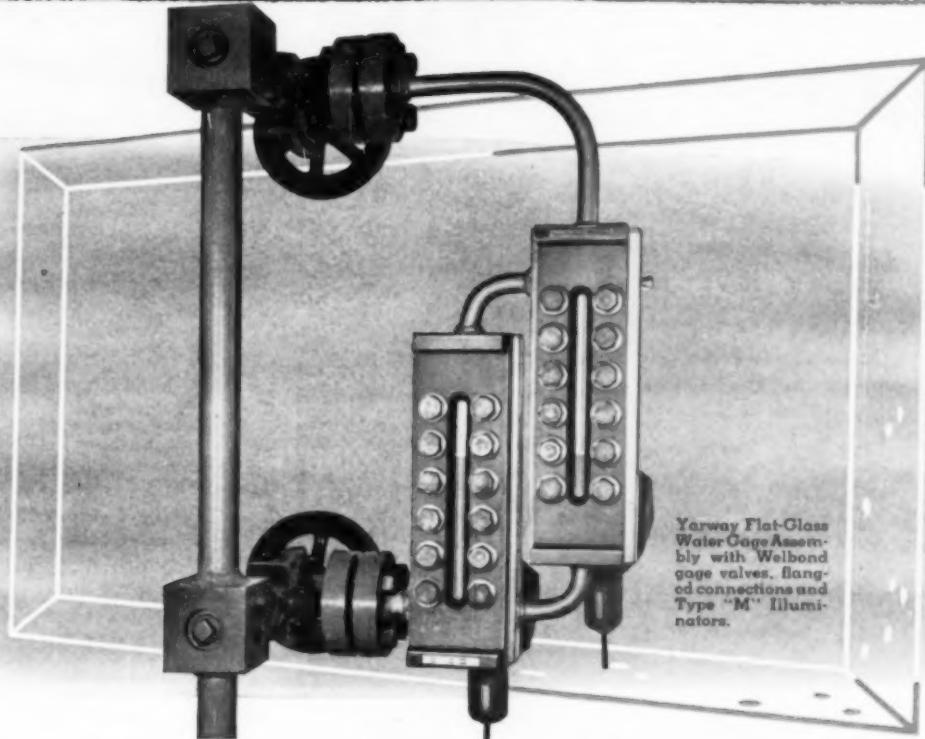
HAGAN BUILDING, PITTSBURGH 30, PA.

BOILER COMBUSTION CONTROL SYSTEMS
RING BALANCE FLOW AND PRESSURE INSTRUMENTS
METALLURGICAL FURNACE CONTROL SYSTEMS
CONTROL SYSTEMS FOR AUTOMOTIVE AND
AERONAUTICAL TESTING LABORATORIES



What's New

IN BOILER WATER LEVEL INDICATION?



Yarway Flat-Glass Water Gage Assembly with Welbond gage valves, flanged connections and Type "M" illuminators.

NEW SEPARATED-DESIGN WATER GAGES

This new Yarway water gage assembly has been developed to meet the demands for greater dependability, longer life, and more accurate readings in high pressure service.

The gage glass inserts are of the Yarway pressure-sealed "floating assembly type". Yarway Welbond gage valves are used. Greater flexibility is gained by using two independent inserts, and by interconnecting expansion loops (see above).

The short connection to the drum assures greater accuracy of the gage reading, and the lower flanged connection eliminates a stuffing box. The upper flanged loop connection between the insert

and gage valve allows expansion and contraction of the various components.

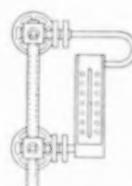
The tie bar-type water column linking the gage valves provides circulation to keep gage nearer drum temperature.

Yarway Type "M" Illuminators on the gage inserts cause the meniscus at water level to "shine like a star". This illuminator is especially effective in penetrating deposits on gage glass, dust particles in air and extraneous light.

For full information, write for Yarway Bulletin WG-1811.

YARNALL-WARING COMPANY • Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative: ROGER A. MARTIN, Bonn Allen Building, Atlanta 3, Ga.

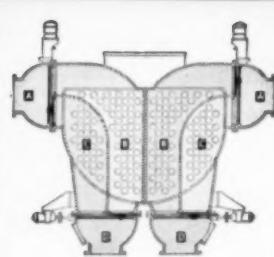
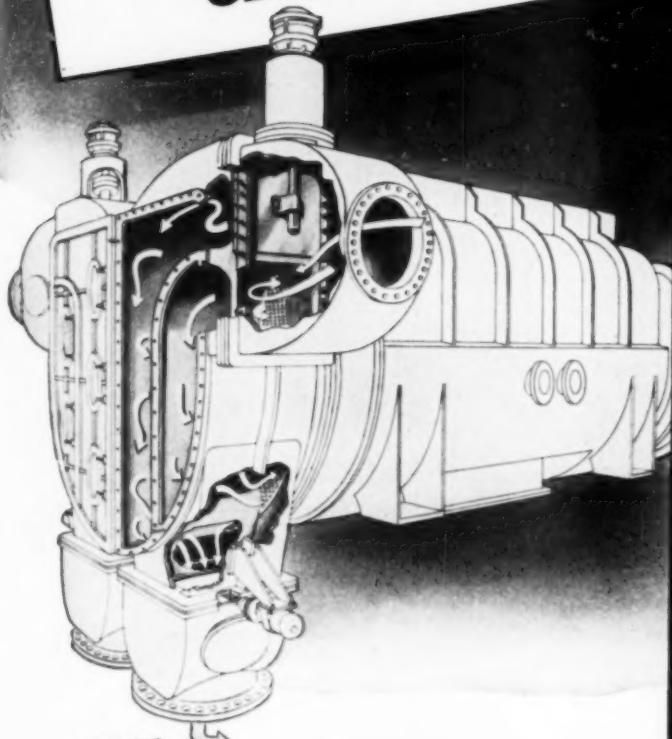


Yarway Single Insert type gage for medium range of visibilities.

YARWAY

STEAM PLANT EQUIPMENT

Here's a 3-WAY "ASSIST" On Your Power Plant Problems



HERE IS HOW REVERSE FLOW WORKS

Reverse flow sluice gates on divided water box condensers work the same in both halves but independently of each other. Right side: normal flow of water enters divided water box in tube chamber "A" with lower port open. It flows through pass "C" to end of condenser, back through pass "B" and out through left port of "D".

Left side: flow is reversed. Valves at inlet "A" and discharge "D" are changed to admit water from the outside and back through "C" in the opposite direction and then out through the left port of "D".

1 CLEAN DEBRIS FROM CONDENSER TUBE SHEETS WITHOUT DOWNTIME OR LOSS OF VACUUM

C. H. Wheeler "Reverse Flow" Condenser design provides a powerful self-cleaning flushing force by the simple procedure of reversing the flow of water through the tubes. Electrically or hydraulically controlled sluice gates accomplish in minutes cleaning that consumes hours of down-

time when removal of debris is done by hand. Power plant modernization calls for the efficiency and uninterrupted operation of C. H. Wheeler "Reverse Flow" Condensers. You don't need costly water straining apparatus. Send for latest bulletin #410.



2

VACUUM PUMPS WITH LOWEST MAINTENANCE FOR YOUR STEAM CONDENSERS

C. H. Wheeler Steam Jet Ejectors are the development of 35 years of pioneering in this field. Known as "Tubejets," these vacuum pumps have no moving parts. Hence, they are simple to operate, require almost no maintenance and last longer. Modern Power plants use single or two-stage Tubejets with surface inter-after condenser for n.e. vacuum requirements of steam condensers. Special arrangements of standard Wheeler ejector assemblies can be provided for any unusual installation or performance requirements. Catalog #1462 gives you detailed descriptions and some useful temperature and pressure conversion tables. Write for it.



SPECIAL TYPE TUBEJET VACUUM PUMP FOR
HIGH PRESSURE AND HIGH SUPERHEAT

3

WHEELER-ECONOMY CIRCULATORS HANDLE LARGER VOLUMES OF WATER AT LOWER COST

Wheeler-Economy Pumps for Condenser Cooling Water Circulation are made in horizontal double suction and vertical submerged, axial mixed flow types. These pumps are noted for reliability, the result of superior modern design and heavy duty, quality construction. They are built in all sizes to meet capacity requirements up to 200,000 GPM. Wheeler-Economy Circulating Pumps are also furnished in special metals to handle corrosive waters. The impellers are designed for satisfactory operation during all load requirements.

Economy engineers are pioneers in the successful application of axial flow pumps in circulator service. These pumps can be furnished in "pull-out" type with distinctive design features, permitting removal of all operating parts, without dismantling the complete pump or disturbing any pipe connections. For top performance in power plant duty count on Wheeler-Economy Pumps. Write for catalogs #G-349 and G-1050.



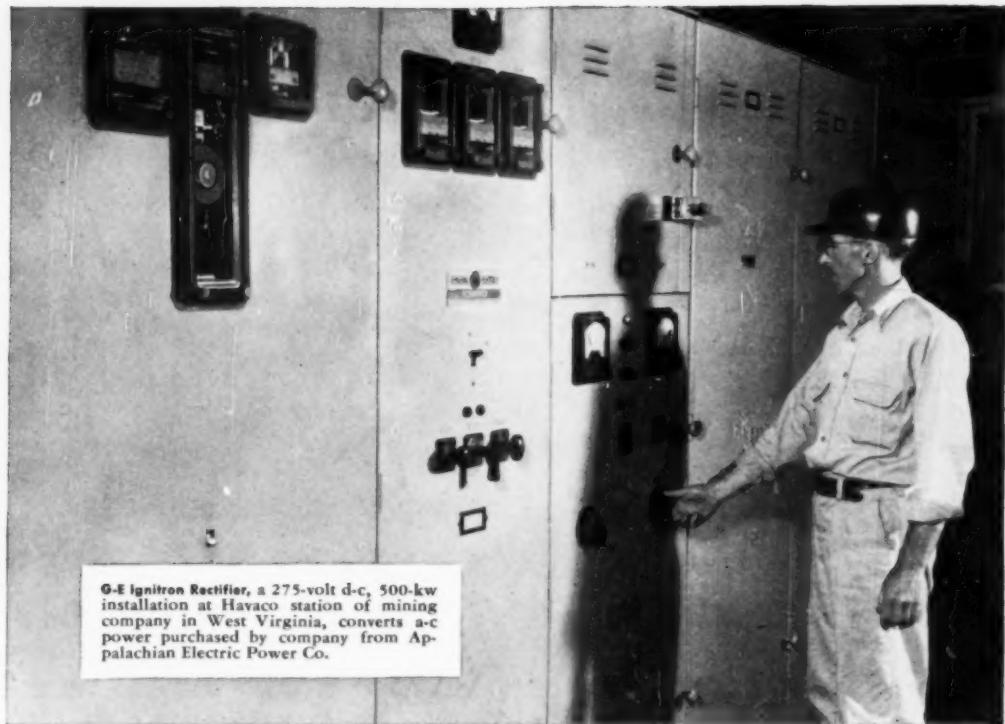
THREE CIRCULATORS OF 28,000 G.P.M. CAPACITY.
35 FT. TDH, 575 RPM.

105-R

C. H. WHEELER of Philadelphia

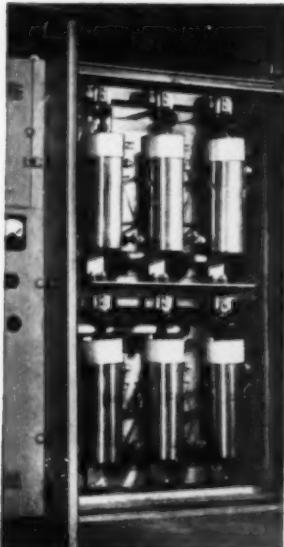
C. H. WHEELER MANUFACTURING CO., 19th & LEHIGH, PHILADELPHIA 32, PENNA.

Steam Condensers • Centrifugal, Axial and Mixed Flow Pumps • Steam Jet Ejectors • Cooling Towers • Vacuum Refrigeration
High Vacuum Process Equipment • Micro-Particle Reduction Mills • Marine Condensers and Ejectors • Deck Machinery.



G-E Ignitron Rectifier, a 275-volt d-c, 500-kw installation at Havaco station of mining company in West Virginia, converts a-c power purchased by company from Appalachian Electric Power Co.

8 years of dependable operation



Six tubes for power. Rectifier features simple design, no major moving parts to wear out.

G-E Ignitron Power Rectifiers, requiring minimum maintenance, operate at top efficiency under rugged mining conditions.

For round-the-clock service, year in and year out, G-E Ignitron Rectifiers give dependable d-c power under most adverse circumstances.

In the mountainous, isolated areas of West Virginia's mining country, for example, seven General Electric rectifier substations, all equipped with Ignitron Rectifiers, have serviced mines of a large coal producing company in the New River and Pocahontas fields since 1944. And over this 8-year period, the company reports, the G-E Ignitron Rectifiers have given safe, and near continuous service—with very low overall maintenance costs.

Proved-in-service G-E Ignitron Rectifiers are chosen for these hard jobs because they provide maximum

protection to operating personnel . . . possess an efficiency generally higher than rotating power-conversion units . . . have no major moving parts that need replacement or require extensive upkeep. And they are reliable. If regular inspection periods are maintained, G-E Ignitron Rectifiers can be left unattended, for months at a time, with the assurance they will give satisfactory service during all that period. Supplied as a complete packaged unit with transformer and metal-enclosed switchgear, the installation occupies minimum space.

Call or write your nearest G-E sales office for information on a G-E Ignitron Rectifier to fit your d-c power requirements. General Electric Company, Schenectady 5, N. Y.

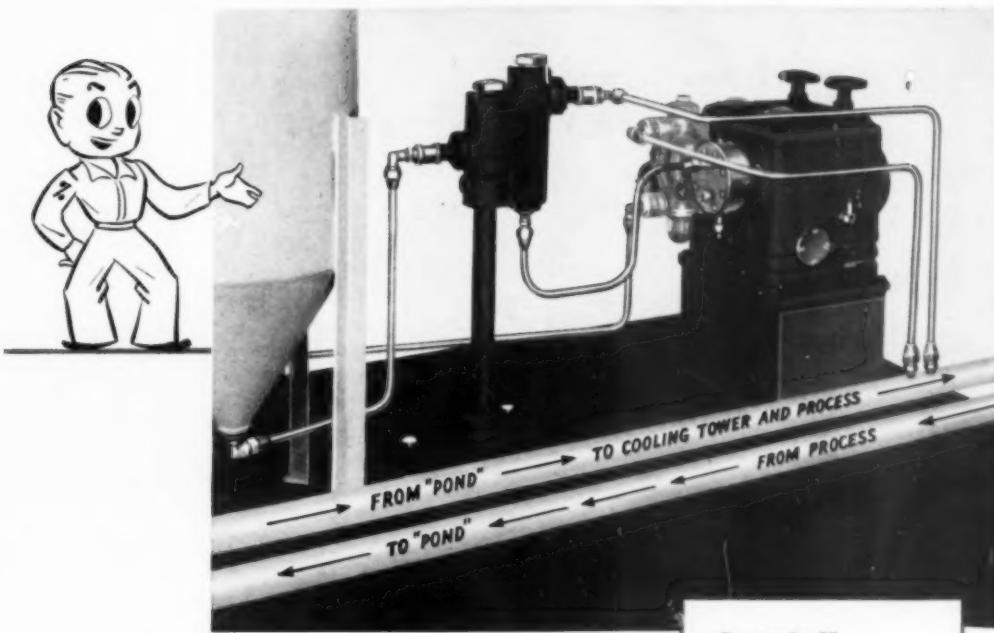
3246

GENERAL  **ELECTRIC**

HERE'S POSITIVE

Chemical Control

FOR YOUR COOLING WATER SYSTEM



Injection of treating chemicals into the line supplying water from the "pond" to the cooling tower prevents formation of slime and algae, and maintains the most efficient operating conditions throughout the cooling system. The chemicals are fed automatically at a constant, predetermined rate, or flow responsively in accordance with makeup demand. If a pH-responsive system is desired to maintain the optimum pH conditions, the metering pump can be readily adapted to this control. The Chem-O-Feeder in this "package" is a diaphragm-type unit, which can be supplied with one, two, or three measuring chambers, each having a maximum capacity of ten gallons per hour at pressures up to 100 psig. As many as three different chemicals can be handled at the same time. When equipped with an indirect displacement unit, the Chem-O-Feeder readily feeds hard-to-handle chemicals used in cooling water treatment.

Ask for recommendations and descriptive literature

SEE US AT BOOTH 94 AT THE POWER SHOW

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Technical service representatives in principal cities of the United States, Canada, Mexico and other foreign countries.

Visit Booth No. 6

NATIONAL POWER EXPOSITION

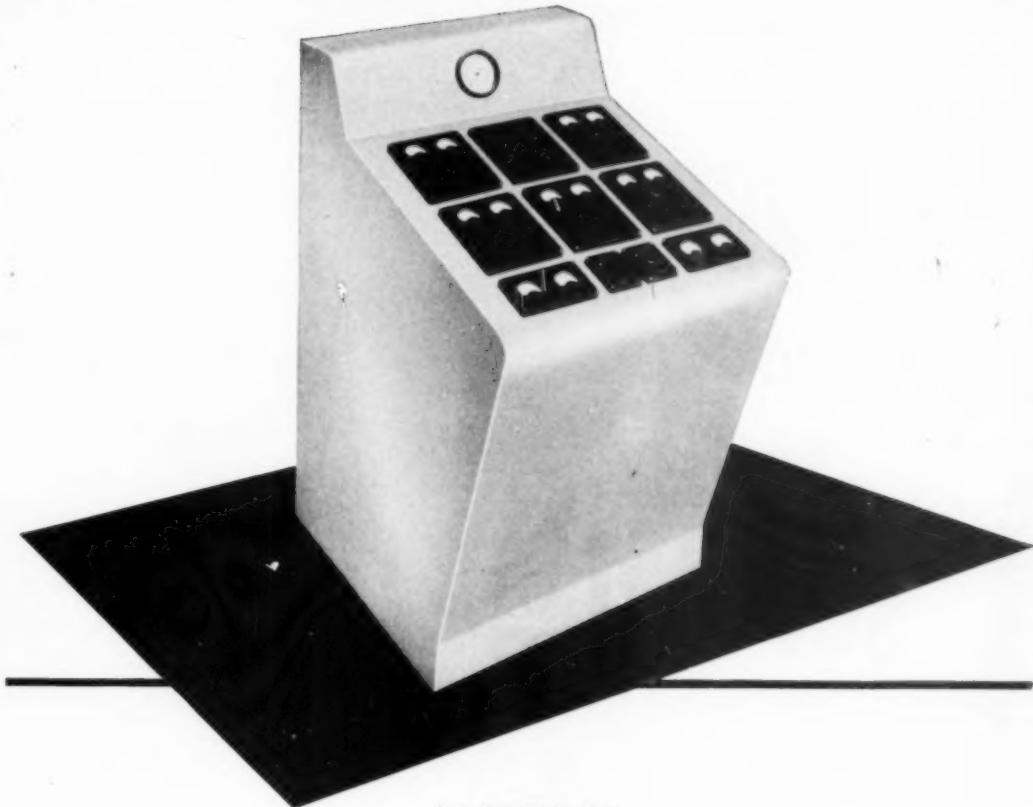
New York City • DECEMBER 1 to 5

You are cordially invited to visit Booth No. 6 to inspect the Republic Electronic TELEMASTER Control which will be on exhibit. Our engineers will be available to explain its many unusual features. The complete line of Republic instruments and controls will also be included in the exhibit.

REPUBLIC
Electronic Master Control System
"TELEMASTER"

The Republic Electronic TELEMASTER Control represents a major advance in the field of automatic control. The TELEMASTER will remotely reproduce, quickly and accurately, a position or a force—perform arithmetical and algebraic calculations—and can be used for multiple operation. Essentially it performs the functions of a mechanical link through electrical and electronic means. It is applicable to all types of combustion and process control.

In plants where distances between operating units are great, the lags inherent in the compression effect of a pneumatic master system are appreciable. This effect is frequently sufficient to prevent realization of the full benefits of automatic control. The Republic Electronic TELEMASTER Control has a minimum inherent lag, independent of distance. This means that centralization of operations can be achieved without any sacrifice of control performance. *Full details sent upon request.*



FEATURES

NO DEAD SPOTS OR LAGS

The TELEMASTER operates on a null-balance principle with a constant check-back between the initial input and final output, with no intervening mechanisms to cause dead spots or lags. This balance type detection of any deviation in the desired operating conditions, produces a highly responsive and fast acting control system.

ELIMINATES PANEL PIPING

No control panel piping is necessary with the REPUBLIC TELEMASTER. Easily installed, multi-wire cables are the only connection between the TELEMASTER benchboard and the plant measuring and control elements. Results? Easier, faster and better appearing installation, increased flexibility, economy, and reduced maintenance.

GREATER APPLICATION FLEXIBILITY

Flexibility required for complete centralization of controls at a central focal point is a distinct feature

of the TELEMASTER. The system may be operated under completely automatic, semi-automatic, or manual control from a central supervisory station.

PLUG-IN INTERCHANGEABLE PARTS

Due to simplicity, compactness and interchangeable component parts, the TELEMASTER provides a more flexible control system and a more condensed panel area than previously possible. All parts subject to replacement are mounted on compact plug-in units that are easily interchanged and replaced with spare parts.

REDUCED MAINTENANCE

Control room maintenance is sharply reduced. No moving parts or mechanisms are mounted on the control panels. Panel equipment is smaller and less cumbersome, no panel piping is used. Plug-in replacement parts may be installed in a matter of seconds. All components of the TELEMASTER are fully tested and proven for prolonged trouble free service.

REPUBLIC FLOW METERS CO.

2240 Diversey Parkway, Chicago 47, Illinois

NAVCO "Universal" PIPE SUPPORTS

Insulated

Vertical adjustment up to $2\frac{1}{2}$ inches can be made.

Support may be turned to any angle of 360° .

Will take care of 8 inches of travel.



Features

Universal Pipe Supports hold the pipe down as well as up. They prevent pipe from getting out of alignment, which is usual when Roller Supports are used.

They permit control of expansion movement and insure the desired free action of Slip Expansion Joints so essential in tunnel and duct work.

Expansion movement of pipe will not disturb the insulation.

Made in Cast Iron or Steel and provided with forced lubrication for lines exposed to the weather.



NAVCO PIPING

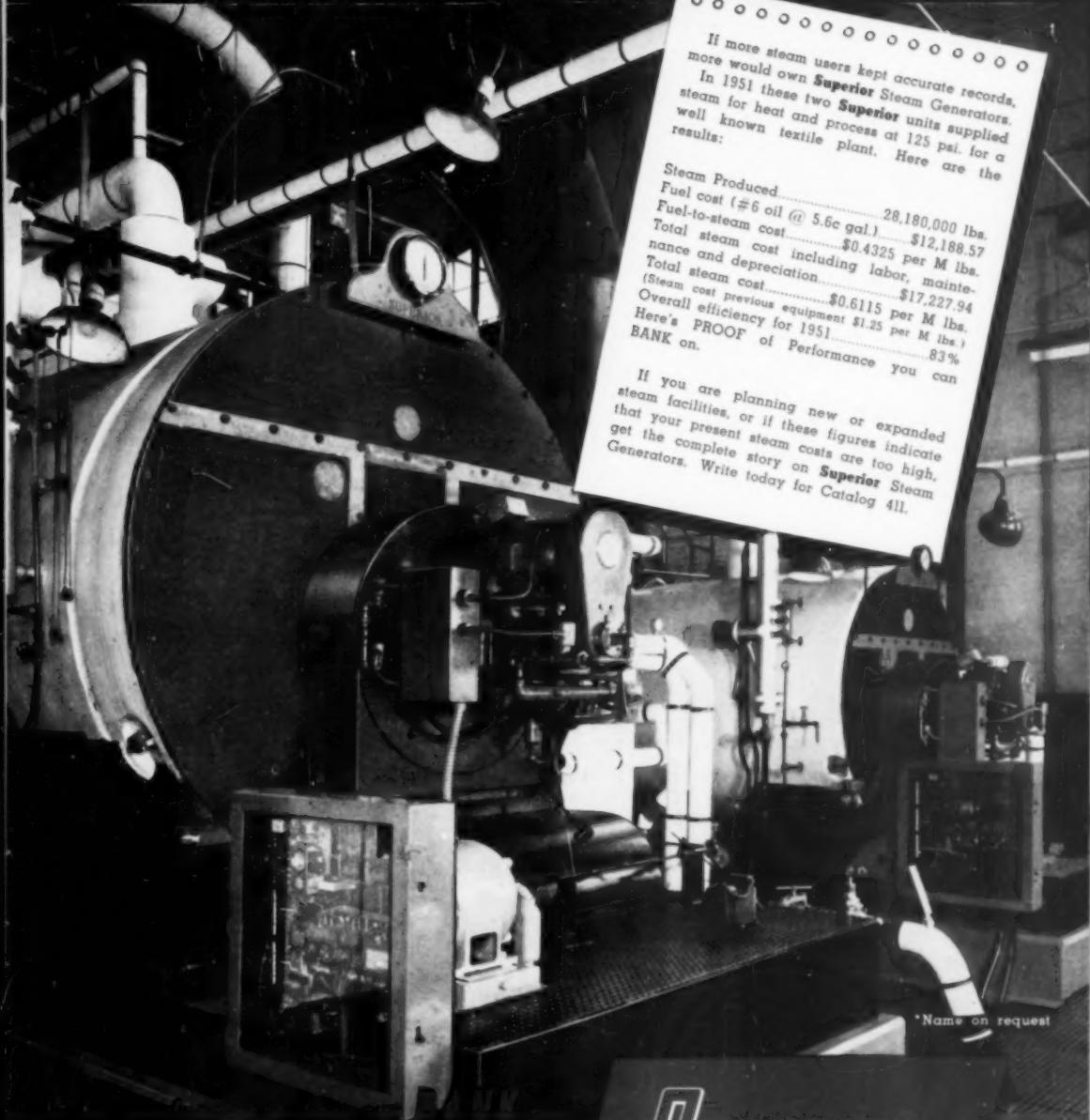
NATIONAL VALVE & MANUFACTURING COMPANY • PITTSBURGH, PA.

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accept no estimate of economy

LOOK at these *actual* STEAM COSTS

from a prominent Rhode Island Textile Manufacturer*



If more steam users kept accurate records, more would own **Superior** Steam Generators. In 1951 these two **Superior** units supplied steam for heat and process at 125 psi. for a well known textile plant. Here are the results:

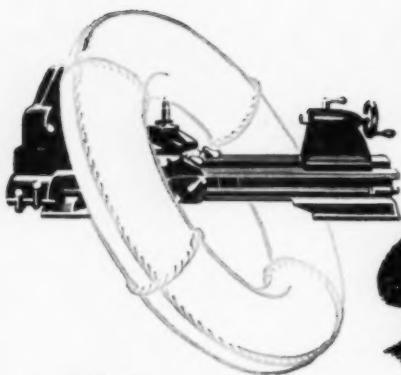
Steam Produced.....	28,180,000 lbs.
Fuel cost (#6 oil @ 5.6c gal).....	\$12,188.57
Fuel-to-steam cost.....	\$0.4325 per M lbs.
Total steam cost including labor, maintenance and depreciation.....	\$17,227.94
Total steam cost.....	\$0.6115 per M lbs. (Steam cost previous equipment \$1.25 per M lbs.)
Overall efficiency for 1951.....	83%
Here's PROOF of Performance you can BANK on.	

If you are planning new or expanded steam facilities, or if these figures indicate that your present steam costs are too high, get the complete story on **Superior** Steam Generators. Write today for Catalog 411.

*Name on request

SUPERIOR
STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 18, N.Y.



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QUICK . . . economical replacement of worn bearings in machine tools and industrial machinery with Bunting Standard Stock Bearings in 854 sizes.

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BRONZE BEARINGS • PRECISION BRONZE BARS • BUSHINGS

...IN STOCK EVERYWHERE

Bunting products are instantly available in all markets, from the stocks of leading industrial distributors and distributors of specialized industrial items. Ask your distributor or write for catalog.



THE BUNTING BRASS & BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

LONG LIFE is ASSURED WHEN P.P.&E. *Produces...*



the Nerves, and the Blood Vessels

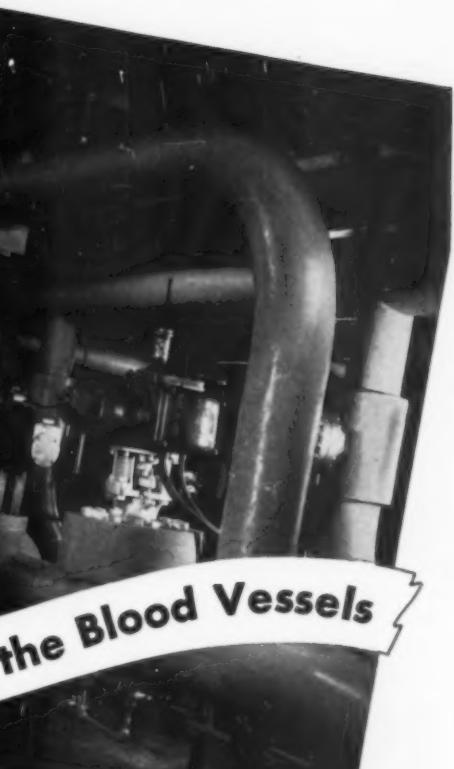
*... of Your
High Pressure
High Temperature
Piping System*

The blood-vessels (main lines) and the nerves (control lines) of a power piping layout are equally essential to keep the entire system "full of steam."

And — the material from which the piping is made — and the way it is put together — will determine the efficiency and longevity of the system.

It's possible for a strong man to be a "physical wreck" because of a deficiency in his nervous system — and it's just as possible for a power plant to perform erratically because of inefficient engineering and installation of accessory piping.

P.P.&E. is just as careful to build sound "nerves" into a power piping system as it is to provide strong "blood vessels."



Pittsburgh Piping

AND EQUIPMENT COMPANY

10 Forty-Third Street — Pittsburgh, Penna.

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Wainwright Building, Atlantic
Bank Tower, Detroit
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Peoples Gas Building, Chicago
Public Square Building, Cleveland
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Heights State Bank Bldg., Houston

Choose the proved way to transmit high hp at high speeds

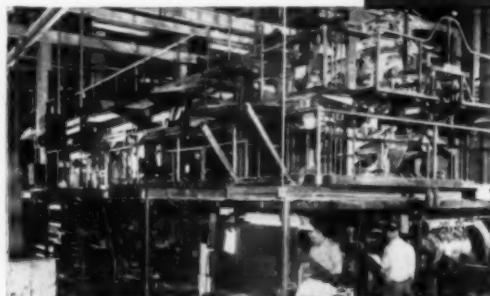
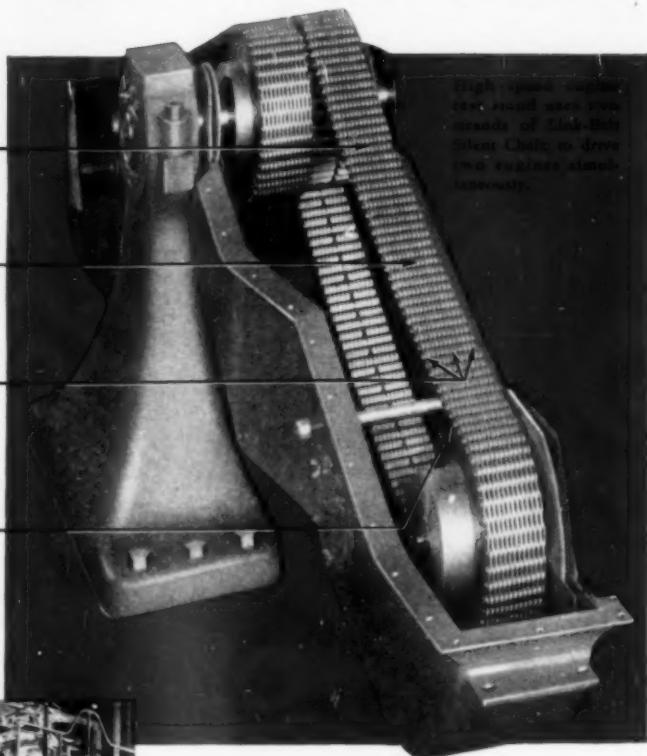
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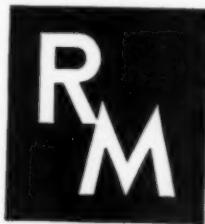
LINK-BELT Silverstreak Silent Chain Drives are slip-proof ... slap-proof ... shock-proof

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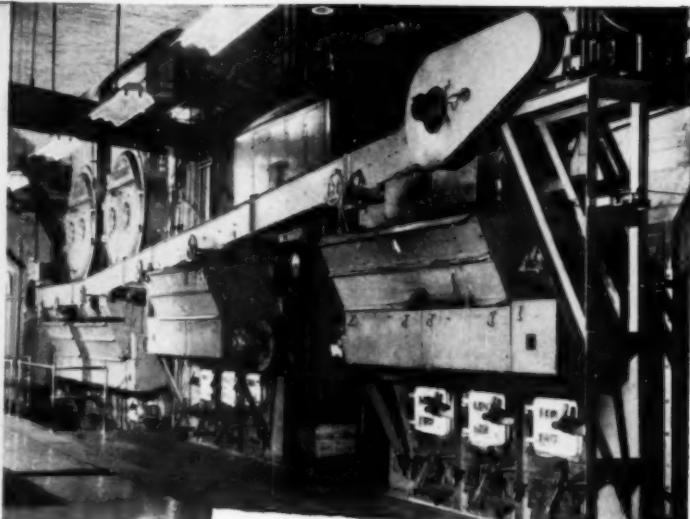
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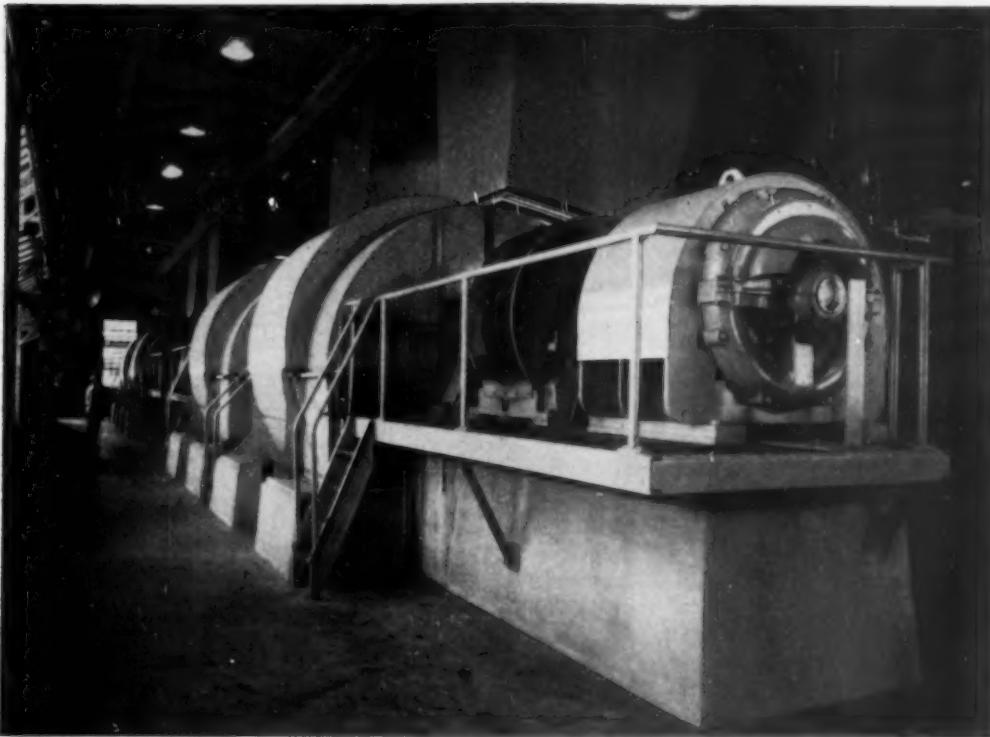
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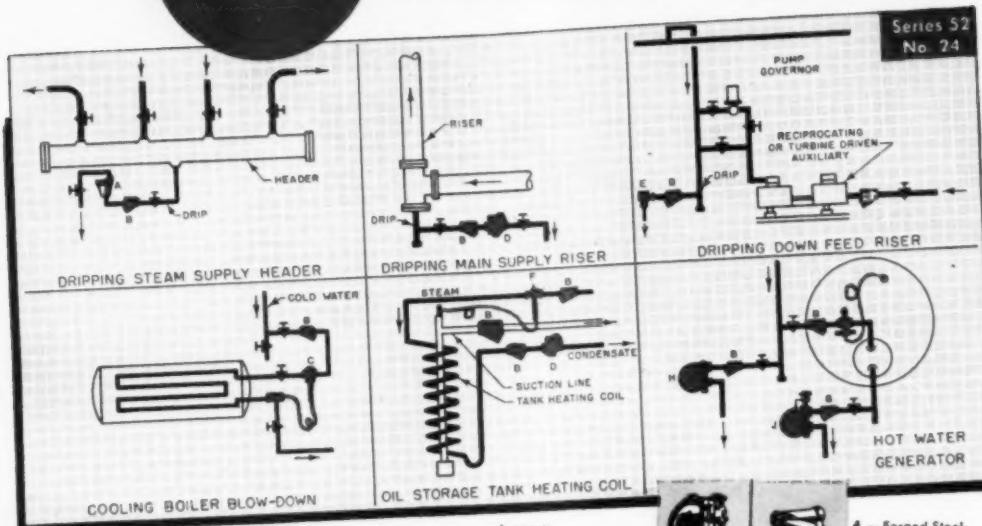
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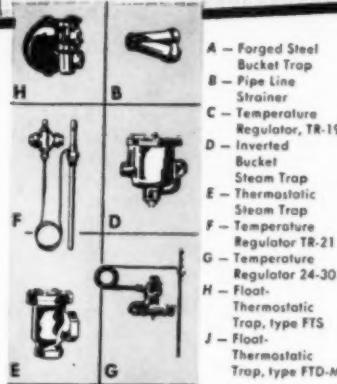
Sarco makes four distinct types of steam traps and can give you unbiased advice on the best type for any job, based on 30 years experience and thousands of installations. **Write for trap selector chart 145-4.**

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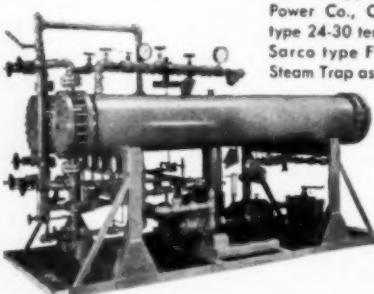
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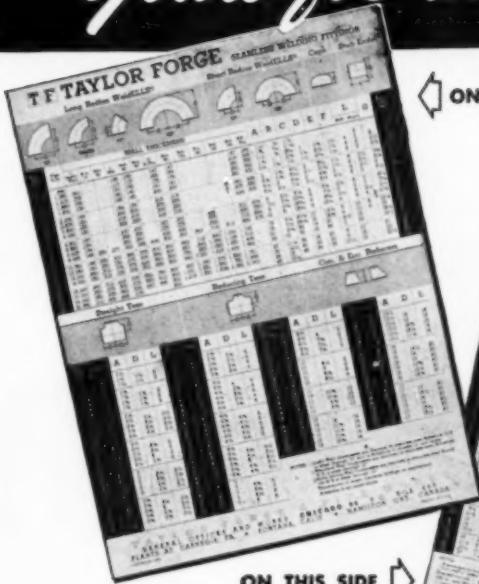
SARCO saves steam
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Enterprise dual pump set to preheat 3,200 gph of Bunker C fuel oil to 225°F. Supplied by Enterprise Heat & Power Co., Chicago, Ill. with Sarco type 24-30 temperature regulator and Sarco type FTQ Float-Thermostatic Steam Trap as standard equipment.



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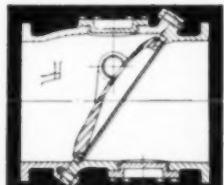


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Look again, and see how this Tilting Disc... pivoted just above center... is practically balanced, so is easily held open... and then cushions quietly to a drop-tight seat. This means no slamming under usual piping arrangements, no opening of pipe joints, no wear of valve parts.

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Cross-section of the Chapman Tilting-Disc Check Valve. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

CHAPMAN  **CHECK VALVES**

Timely Comments



Hitting the Jackpot in Industrial Research

industry was in the doldrums. Normal annual production greatly exceeded demand. Prices were low. Orchards were selling for little more than the price of vacant land.

In this emergency, local industry leaders persuaded the state to finance a research commission, in which scientists from the University of Florida, the USDA, and other groups participated. In a remarkably short time, this cooperative research effort produced the method for canning and marketing a juice concentrate having natural flavor and nutritive value. The method was introduced in 1946, when about a quarter of a million gallons of concentrate were produced. Public acceptance was almost instantaneous, and within four years production skyrocketed to more than 25 million gallons—the equivalent of more oranges than the state grew in 1929.

Obviously, the citrus research program has meant millions to Florida business firms. There has never been a better investment in the state than the money put into the concentrate development.

In all parts of the South, there are striking demonstrations of the payoff in industrial research. The process of making newsprint from slash pine, the recovery of chemicals from pine stumps, the manufacture of nylon ingredients from corn cobs, the manufacture of wallboard from sugar cane residue, and many similar developments are well known.

An example of the payoff in mineral prospecting studies can be found in the McIntosh, Alabama, area. A group of Alabama industrialists several years ago sponsored a geological survey of South Alabama. This survey was published and the geological map attracted the interest of several large chemical firms. These companies subsequently made additional explorations and identified a large salt dome at McIntosh, about forty miles north of Mobile. The area has been the scene of a typical chemical merry-go-round.

First Mathieson began construction of a large alkali chlorine plant. Then Courtaulds, a British firm, came in with a rayon plant to use some of the caustic soda to be produced in the alkali plant. Soon after, Stauffer Chemical located a carbon bisulfide plant next to Courtaulds to supply them with an essential ingredient. This was followed by the establishment of two insecticide plants. Another chemical firm is now beginning construction at McIntosh. Alabama Power Company helped the merry-go-round along by scheduling a new steam generating plant for that area, and it is now apparent that South Alabama will enjoy a tremendous chemical expansion in the next few years.

The above outstanding examples were noted by H. McKinley Conway, Jr., Director of the Southern Association of Science and Industry in an address "The Use of Research in Industrial Development" before the Seventh Annual Southern Industrial Development Conference in Charlotte, N. C.

Mr. Conway emphasized that Southern technological progress is continuing at an unprecedented rate, with the establishment of 103 com-

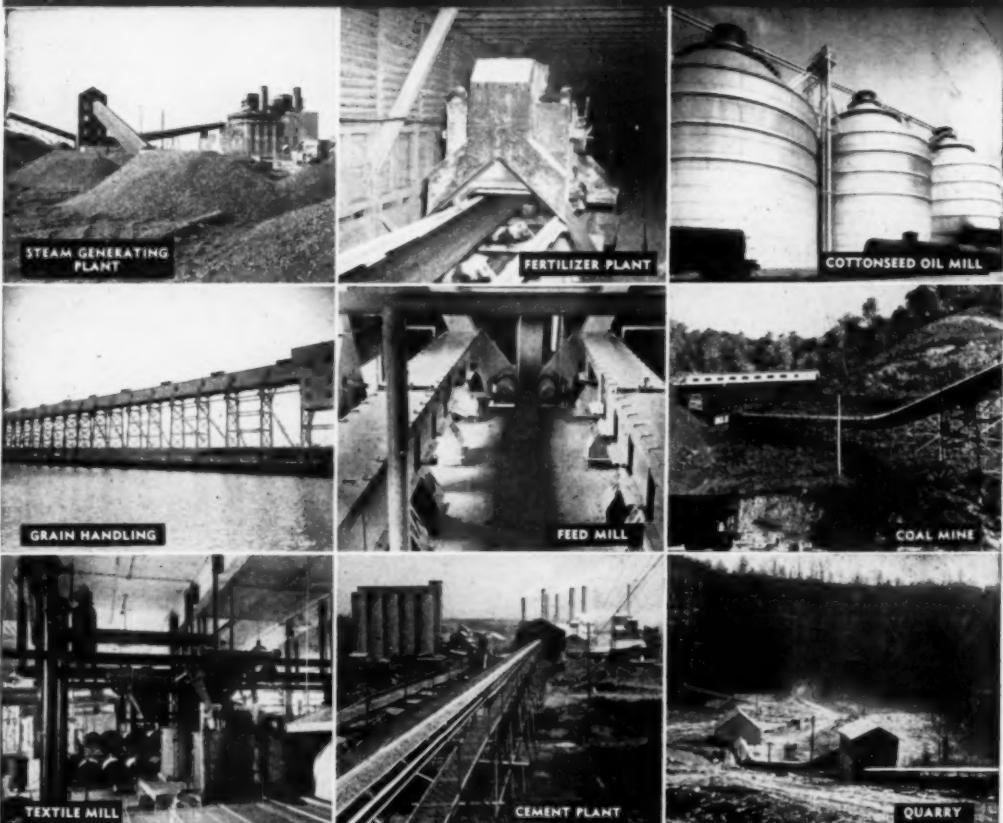
plete new laboratories or major research additions during the past 12 months. He called upon industrial development agencies and research organizations to pool their talents to promote regional economic progress at the fastest possible rate. Mr. Conway is editor of the *Journal of Southern Research*, the *Southern Industrial Directory*, and of various special reports on scientific and industrial activities in the South. The S.A.S.I. maintains executive offices at 5009 Peachtree Rd., Atlanta, Georgia.

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Industry Speaks

SOUTHERN POWER
AND INDUSTRY

Georgia Power Company Dedicates Plant Yates

Company's largest steam plant named in honor of Eugene A. Yates, leader in Southeastern electric power development for forty years.

PLANT YATES has a capacity of 300,000 kilowatts (three generating units with a capacity of 100,000 kilowatts each) and can produce approximately two billion kilowatt hours of electric energy a year. Construction of the plant was begun in September 1948. The first two 100,000 kilowatt units began operation late in 1950. The third unit of the same size was completed in the early fall of 1952. The total cost of the three units was approximately \$32,000,000. Ultimately a fourth unit may be installed bringing the total capacity of the plant to 400,000 kilowatts. A technical description of the first two units appeared in the April 1951 issue of *Southern Power and Industry*.

EUGENE ADAMS YATES, Chairman of the Board of The Southern Company and Director and Vice President of the Georgia Power Company, has dedi-

cated the past 40 years of his life to the development of the electric industry in the Southeast. This period has witnessed the emergence of the South as a progressive and productive economic unit of the nation, a transformation which could not have taken place without the untiring leadership of such men as Mr. Yates.

Following his graduation from Rutgers College he did engineering work in New York, and then came south in 1911 as the construction engineer of an electric railroad in Alabama. Shortly thereafter he joined the Alabama Power Company as Chief Engineer. In this capacity and as a consulting engineer he played a major part in the planning and construction of the Alabama hydro-electric plants.

In 1919 he was selected as consulting engineer to study the inter-connection and integration of the power systems in the Southeast. The plan which he developed has in all important respects become an accomplished fact. Today all major electric power systems of the Southeast are inter-connected, resulting in better service and operating economies which have been of untold benefit to the public. Upon the completion of this work he returned to Alabama Power Company as Vice President and General Manager in 1923. He subsequently held the positions of Vice President and General Manager of Southeastern Power and Light Company and Vice President of Commonwealth & Southern Corporation.

Upon the formation of The Southern Company in 1947, comprising the Alabama Power Company, Georgia Power Company, Gulf Power Company and Mississippi Power Company, Mr. Yates was elected the first President of this organization. He was subsequently elected Chairman of the Board.

Plant Yates, Georgia's largest and most modern steam-electric generating plant, and one of Georgia's greatest industrial enterprises, is fittingly named in honor of Eugene Adams Yates.



Mr. Yates and his grandson beside the plaque unveiled in his honor at dedication ceremonies on October 14.

The official spokesman for America's business men asks



How Much Government

By LAURENCE F. LEE
President, Chamber of Commerce of the United States

IN PRESIDENTIAL years, our thinking frequently becomes entangled in the briar patch of emotion. Our thoughts are lured down rabbit trails by our likes or dislikes for competing candidates. Personalities dominate the political landscape.

Secondary issues assume a stature out of all proportion to their base significance. Primary issues are sometimes swept beneath the rug by the broom of generalities. Our hearts tend to monitor our heads.

But the election is over. We should be in the clear now to appraise the future with candor and dispassion. We have chosen a new President and a new Congress. But we did not settle the fundamental issue of our times.

The issue remains.

Broadly put, the issue is: Socialism or competitive capitalism?

The election in November could not resolve this issue. No one election could resolve this issue. No change in faces in Washington will frighten it away.

For good, in some cases, or for bad, in certain others, the federal government today is deeply enmeshed, if not permanently entrenched, in our economy. There are more civilians on the federal payroll today than the total population of the original 13 colonies in 1776.

It is often good to employ government as an *agent* for all the people in performance of chores beyond our individual or group capacity. This practice is not new. It has a long record of success. Under the Homestead Acts of the 19th century, government, as an agent, served us all and served us well. This contributed to the vitality of our competitive capitalism which must expand to live.

It is always bad to hand government the power of decision that should rest with the free market. Price controls are a latter-day example. The bureaucracy in charge has substantially ignored profits as an incentive to produce, but approved wage and tax increases. It has contrived to force the manufacturer, supplier, distributor and retailer to absorb these costs. It by-passed the simple economic truth that competition in the market place inspires production, attracts the consumer and keeps prices at levels that are fair

to all. Price controls are among the favorite usages of socialism.

Most business men, by the very nature of their work, recognize the difference between government in the role of agent and government as a decision-maker. Give government too free a hand in the role of agent, and the traditional relationship of the people as master and government as servant can easily be reversed.

There is a definite peril point. This is not understood by millions of our people, and the apostles of socialism in America encourage this confusion in every way they can.

In the course of 20 years, we, as a people, have become vulnerable to the blandishments of socialism.

Nothing but a change in the attitude of many millions of Americans can insure us against a slow disintegration of our competitive capitalism as socialism inches its way into our economy, propelled by tireless missionaries.

Two generations have known nothing else but paternalistic government—the generation that came of age in the nineteen thirties and the generation that came of age this year. One generation remembers the bleak days of the depression and—with many and notable exceptions, of course—has been taught to believe that “Washington” pulled us back to prosperity. The other generation accepts “big government” as a natural element in our society.

Regardless of how they may have voted in November or what prompted them to make their choice of candidates or party, both generations—again allowing for innumerable exceptions — are conditioned to accept a major role for government in the national economic drama.

This is the first article in a series by leading Americans written especially for SOUTHERN POWER AND INDUSTRY and the other W. R. C. Smith Publications. The next article, by Senator Harry F. Byrd, will appear in our January issue. It will deal with the problem of government spending.

Shall We Hire?

No. 1 of a series on problems
of business and government

Both political parties have been infiltrated by men who do not call themselves *socialists*, but who believe in *socialism*. They are aware that we will never buy socialism under that name at the ballot box, so they avoid the tag. They profess aversion to government ownership of industry. But they avidly crusade to make private ownership eventually impossible.

They hope to have a field day if we experience a post-mobilization readjustment in our economy, as presently seems likely. All the old socialistic sleepers will be trotted from the stables. There will be a loud, new hue and cry for federalized housing, federalized education, federalized medicine. The socializers will clamor for a new WPA, ten times the size of the 1933 model.

Old untruths about the usages of government will be repeated, and we will hear a host of new ones—all calculated to instill the idea that our economy cannot provide for its people without government at the steering wheel. If the people buy these falsehoods, no president and no congress can save free enterprise.

Counter Untruths with Facts

It behooves the business community to anticipate the socializers. The socializers have an Achilles heel. Facts can hamstring them. But not unless these facts are diffused at the community level—and not unless the facts are couched in crystal clear language, easily grasped.

The business man must constitute himself an individual center of initiative to knock down the untruths of socialism with the unadorned facts, but that is merely half his obligation. The other half consists of translating the facts into the language of his own Main Street. This kind of leadership is not simple, but it is a plain case of "lead or be led to liquidation."

Let us consider a few of the socializers' favorite untrue and misleading statements and balance the untrue with the fact:

1. Untrue. Federal government devices "cured" the depression of the nineteen thirties. Federal government "solved" the unemployment problem. Therefore, more government is a good thing.

Fact. In 1933, unemployment was estimated in excess of 11 million. Seven years and billions of tax



MR. LEE is president of the Peninsular Life Insurance Co., Jacksonville, Fla., and of the Occidental Life Insurance Co., Raleigh, N. C. For years a leading figure in the U. S. Chamber, he was elected president last May.

dollars later, there were still about 8 million unemployed. Meanwhile, one government device after another had thwarted the efforts of private industry to develop new markets, expand the industrial plant and create new jobs. The benzedrine of war and remobilization stimulated our seemingly prosperous times.

2. Untrue. The Federal Housing Administration has benefited many people, so we ought to have a full-scale, all-out federal-aid-to-housing setup.

Fact. An FHA mortgage involves no government money. Business men should not assume that every one knows this fact. A surprising number of people do not know that FHA is essentially a self-supporting mutual insurance fund covering private loans operated by the federal government only as agent. The income from the insurance charges paid as part of the regular payments is more than sufficient to meet all costs of administration as well as losses. FHA has helped to make the home mortgage a nationally negotiable instrument. This has facilitated the flow of home financing credit from areas of surplus to areas of need. Moreover, FHA accounts for only a third of the mortgage market. Most mortgages are of the conventional type. This is as it should be.

On balance, the FHA falls into the category of government hired as an agent.

3. Untrue. "Look what the federal government has

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done for the farmers! It just goes to show that a big government is a good thing."

Fact. Business organizations, by and large, endorse the principle of helping the farmer strike a balance between the cost of things he buys and the commodities he has for sale. A prosperous agriculture is a nationally sound objective, and the farmer's operations are at the mercy of nature in all her fickle moods. This somewhat sets him apart from the rest of us.

The further fact is that a high level of demand from consumers here and abroad has made the farmer prosperous. His produce has seldom gone begging since the early stages of World War II. In recent years, many of the more important farm commodities have been above parity levels.

4. Untrue. "Look at the great success of TVA. This proves that government should build more hydro-electric dams and go into the power business more and more."

Fact. In the next several years, TVA will be generating more electric power by steam generators than by water power. It has charged off (to the taxpayers of the whole country) about one hundred fifty million dollars of the cost of its hydro-electric dams in the name of navigation. TVA pays no interest on the government funds it uses; it pays no federal taxes. It costs the government more to keep the Tennessee River open to navigation than it would to pay the freight bills for every one who uses barge transport on the Tennessee and—ship the goods by rail.

TVA has charged off (to the taxpayers of the whole country) another one hundred fifty million dollars in the name of flood control. But the government's own General Accounting Office states that TVA "has not conclusively substantiated the flood control benefits."

It is self-evident that the uses of a dam for both flood control and hydro-electric power are incompatible. If the dam is full of water stored for power use, it will have no room for storage when the flood comes. If space is left behind the dam for flood control storage, the water is not there during the dry summer months when the power storage is needed.

The private utilities of this country are anxious to build hydro-electric dams (at no cost to the taxpayers) wherever the costs compared with the potential income would make the venture pay off. The rates which private companies charge are fixed, of course, by state utility commissions. So it follows that public dams fall into one of two categories: either the dams would have been built by private enterprise, or they are uneconomic investments. Private utilities pay taxes, including taxes for local elementary and secondary schools. Government utilities eat tax dollars.

These are merely samples of free-wheeling untruths as countered with the facts. We can all think of many others. The socializers will point to the Federal Deposit Insurance Corporation as a splendid example of government-in-business. The fact, of course, is quite different. Through the FDIC, we employ government as an agent to insure bank deposits up to \$10,000. The taxpayers are not stuck for the premium costs.

Within the intent of the law, at least, our social security program is another example of employing

the federal government of this country as an agent.

Properly administered, these devices are useful to competitive capitalism. The socializers constantly endeavor to use the "agency authority" of government as a cover for less defensible and indefensible aids and subsidies. To put it in down-to-earth American language: That is their gimmick.

The great fact, against which the untruths of socialism blunt themselves, is best framed as a question:

"If a big government is vital to the well-being of our people, why has socialism failed so miserably wherever it has been tried?"

The American success story is the miracle of modern times. Competitive capitalism works. It works so well we seem to think we can siphon off billions of our substance to shore up the economies of socialistic nations which have not succeeded and give but scant promise of success. American counterparts of European socialists would exchange proved success for certain failure. In their economic concepts, they reincarnate the thinking of the feudal ages. They may call themselves "liberals," but they are, in truth, "reactionaries" of the blackest stamp.

The great untruth they peddle is this: That freedom is divisible.

Freedom is not divisible. Freedom involves the right of free speech, free worship and the free press. But it also involves our economic liberties. They are also human rights.

The right of property is a human right. The right to invest is a freedom, and so is the right to invest without unfair competition from government. The right to quit a job or take a job is an economic right, but it is also a human right.

The right of free decision entails more than a free choice of church and reading matter. It entails the right of free decision in the market place. Freedom in America is a blend of personal and economic liberties.

Freedom is the pith of the American story.

The test must be: Who makes the economic decisions?

If they are made by the business man in his office, the farmer in his fields, the worker in his free and voluntary union—or the housewife at the shopping center, then competitive capitalism will live on and shower us with greater benefits.

If the decisions are made in Washington, we are headed for socialism, a rationed existence, rationed opportunity and degeneration to a third-class power, ripe for the plucking by imperialistic communism.

Further Notable Articles in This Series

This is the first of a series of articles on problems of business and government. Among the authors of the articles to follow are: Senator Harry F. Byrd; John W. Hanes, Chairman of the Tax Foundation; A. L. M. Wiggins, Chairman of the Atlantic Coast Line Railroad; C. H. Greenewalt, President of E. I. du Pont de Nemours & Co.; Senator George A. Smathers; Frank Wilkes, President of the Southwestern Gas & Electric Co., and E. V. Rickenbacker, President of Eastern Air Lines. Others of equal prominence will be added.

Heater Drain Piping Deterioration

By LOUIS S. GEE

Engineer, Production Department
West Texas Utilities Company
Abilene, Texas

The object of this article is to give power engineers a better understanding of the causes of deterioration of heater drain piping.

THE power engineer who understands corrosion and erosion has greatly enhanced his ability to make proper decisions as to steps he may take toward preventing heater drain piping deterioration in his particular installation. Unquestionably a study of recent publications pertaining to the design of heater drain piping for flashing mixtures and of preventative measures taken in certain installations will greatly assist the power engineer in solving his own drain piping problems. The engineer should remember though, that as of today a completely rational scheme of piping design to eliminate erosion difficulties has not been devised.

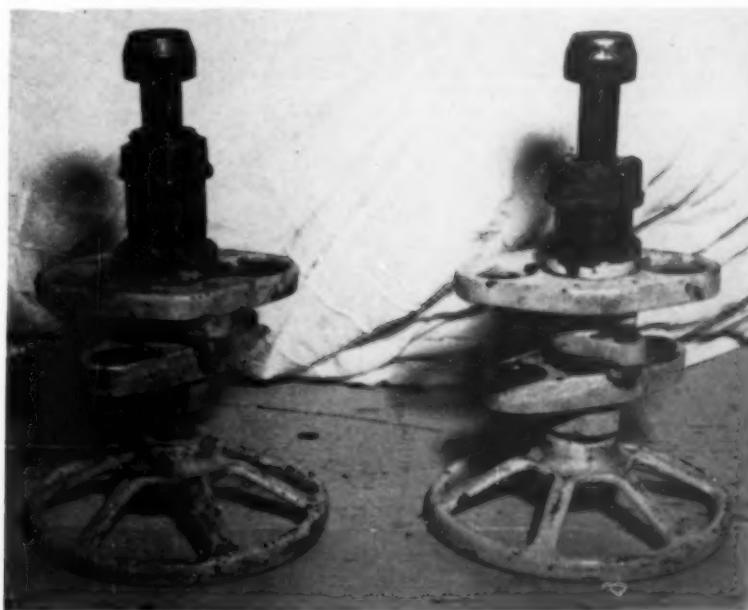
There is a common fallacy today of contributing drain piping failures to the condensates flashing, while actually the failures are caused not by the flashing itself but to the instantaneous collapsing of the vapor pockets formed at an area away from where flashing occurred. The lack of contributing a part of the failures to chemical actions is also grossly conspicuous. It is also a known fact that where conditions conducive to corrosion exist in the presence of erosion accelerated damage should be expected.

The phenomena causing heater drain piping deterioration are common. A discussion of these phenomena follows.

When the head or pressure acting upon water at a particular temperature is lowered to a value below that corresponding to saturation pressure at this temperature, a portion of the water flashes to vapor and a new temperature is obtained corresponding to the saturation temperature of steam at the new pressure. With further reductions in pressures new temperatures are obtained by further flashings of the water to vapor.

Since power plant heater drain lines are insulated against heat loss, we may for practical purposes assume the total heat content of the mixture is constant throughout any particular drain line. With this assumption in mind the amount

Fig. 1—Recirculating line valve. Note destruction to packing cylinder on valve to left. This was caused by cavitation action.



of vapor that has been formed per pound of condensate can be found for any particular pressure in the drain system. The following formula applies:

$$h = hf + x_2 hfg$$

Where h is the enthalpy of heater drain condensate at the heater from which it will be removed, hf is the enthalpy of water at any

particular temperature in the drain system, x_2 is the pounds of vapor formed per pound of condensate at original conditions, and hfg is the latent heat of evaporation per pound of water at the new temperature and pressure. If the temperature is at any time below saturation temperature at any particular pressure, there will be no vapor at this point.

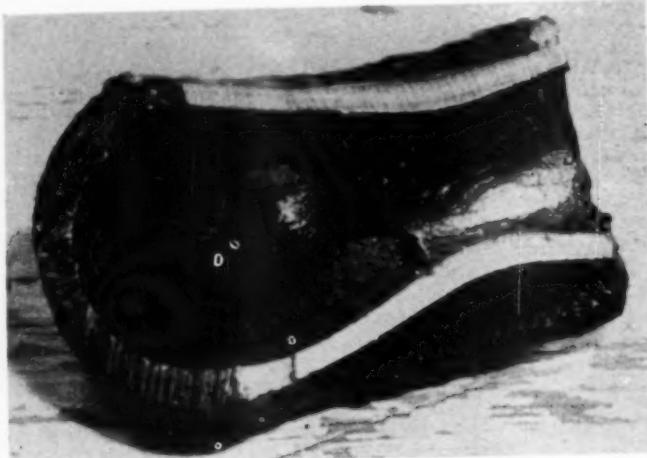


Fig. 2—Elbow destroyed by cavitation. This elbow was backed up by welding on additional material until the heater was taken off line. This elbow was then replaced by tee shown in Fig. 3.

Fig. 3—This tee replaced the elbow shown on Fig. 2. The tee may not be deteriorated by the cavitation action. The physical arrangement of a tee should eliminate collapsing of vapor voids on metal surfaces. Tees have been used with limited success only.



Generally speaking, as the mixture proceeds through the drain system the total head on the mixture decreases with more flashing of the mixture occurring and corresponding decreases in mixture temperature. If at any time the pressure increases after a state of equilibrium is found the vapor changes back to a liquid instantly. After passing regions of higher local pressures the vapor will be reformed. These phenomena are those principally causing erosion in heater drain piping.

The cause and results may be summed up by saying that when the head or pressure acting on the drain passage is reduced to that of vapor pressure of the drains, flashing of the drains into vapor occurs and voids filled with this vapor are formed. Under such conditions, slight changes in static pressure or velocity and resultant changes in the total pressure cause alternate formation and collapsing of these voids to occur. Collapsing of the voids causes intense local water hammer and the water hammers form high local momentary pressures. These high local pressures, or impacts, when adjacent to metallic parts tend to enter microscopic cracks in the metal. These impacts cause plastic flow or deformations leading to cracking and breaking out of metallic particles. Work hardening may occur in the surface layer of some metals with a corresponding change in physical characteristics. The power engineer now recognizes these phenomena as being what he knows as cavitation.

The erosion, due solely from the presence of flashing mixture, is then limited to those areas where changes in total pressures on the mixture occur which result in local pressures greater than the vapor pressure of the mixture. These pressure changes are due to dynamic means and are most common in bends, valves, and where obstructions are in the piping system. In such obstructed sections of the drain piping, cavitation cycles repeat many thousands of times.

Ductile materials may resist potential erosion for a period of time, but breakdowns of large areas eventually occur. If the metal is brittle and of low strength the ap-

pearance of pitting will be very pronounced. Dense metals with high fiber strength will be only roughened on the surface. Where conditions conducive to corrosion exist in the presence of cavitation the damage is accelerated. The products of corrosion will be removed rapidly and a new fresh surface is exposed to the action of the environment. Damage is also accelerated with increases in temperature.

It has been shown in what areas the erosion of drain heater piping will occur. If pipe deterioration is noted in areas where pressures do not exceed the vapor pressure of the mixture, such as in straight smooth pipe sections, this deterioration is caused by chemical actions.

To illustrate the erosive action discussed, a drain control valve will be considered. The total pressure at the valve opening is controlled by the static head and the frictional head in the drain system. If this total pressure is below the vapor pressure of the condensate, a part of the condensate immediately flashes to vapor, lowering its temperature to correspond

with the saturation temperature at this particular pressure. When the flashing occurs the velocity of the mixture is also increased. When the resulting mixture strikes the valve body an impact pressure is produced which increases the total pressure in this immediate area to one above the vapor pressure of the mixture and the vapor instantly condenses causing a local water hammer and high local momentary pressures. These high local pressures cause erosion of the valve body as explained before. When the condensate passes this area at high local pressures to areas with pressures below the vapor pressure of the condensate flashing again occurs.

The action at a bend or where there is an obstruction can be explained by the same phenomena that have been discussed and illustrated. The condensate-vapor mixture while approaching a pipe bend or obstruction has a certain amount of momentum. This momentum is equal to the product of the mass times its velocity. When the mixture reaches a bend or obstruction its direction is changed and to overcome its approaching momentum

and start the mixture flowing in a new direction a force must be applied. The application of this force and the impact of the mixture increases the local pressure and the vapor collapses, again causing an area where local water hammer and high momentary pressures exist. The erosion actions of cavitation then occur in these areas. When the condensate passes these areas of high pressures to areas with pressures below the vapor pressure flashing of the condensate again occurs.

Chemical Deterioration

The mechanical deterioration of drain piping has been discussed, so now a discussion of the chemical deterioration is in order. The principal cause of chemical deterioration is dissolved carbon dioxide in the condensate. Oxygen is seldom present in the steam in modern plants, therefore oxygen should not get into heater drain systems. But if there is air leakage into the drain system, corrosion will be set up by the oxygen present.

The chief source of carbon dioxide

(Continued on page 82)

Fig. 4—Shows location of boiler feed pump recirculating line valves. Refer to photo No. 1.

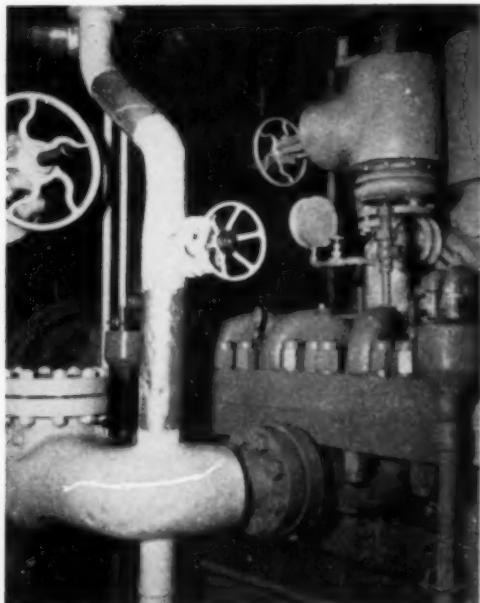
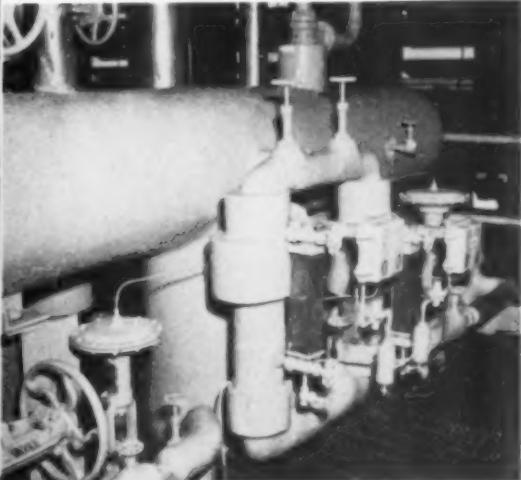


Fig. 5—View of condensate drain system. The control valve on left is for high level heater drains and the one on the right for normal heater drains. Both of these valves have had their bonnets destroyed by the cavitation action. These bonnets have now got liners of resilient materials and we are finding this to be a very good approach towards eliminating valve destruction.



Handling High Peaks at Low Cost in Coal Fired Virginia Plant

By C. A. REED, Director of Engineering, National Coal Association

Photographs by Clifford H. Adams, Staff Photographer, Bituminous Coal Institute

DOWN in a valley in West Central Virginia, but in sight of one of the highest mountain peaks in the state, there is a very special chemical pigment plant. It is special because there are only four companies in the United States that produce the white pigment needed for paints and enamels, which are in such great demand during this era of white finishes for houses, stoves, refrigerators, washing machines, airplanes, ships and a myriad of other items for home and industry.

From the back yard of the plant, a grain and stock farm a decade ago, comes red rock, known as Nelsonite, which is the basic raw material for the pigment. (The name is from Nelson County, where the plant is located.) Through three processing steps

this material changes from red to coal black (Illenite) to pure white (pigment), but the steps are not simple and they use great quantities of process steam.

When the Calco Chemical Division of American Cyanamid Company, with 44 plants in 22 states and 5 foreign countries, took over operation in 1944, its vast experience in making heavy chemicals, pharmaceuticals, biologicals, dyes and dry pigments indicated the need for modernization, but the war delayed any immediate con-

Operating record of this Virginia plant confirms design estimate of 85 per cent efficiency. Steam costs were lowered to 65 cents per thousand, including depreciation, operation, and maintenance.

struction. It was necessary, instead, to continue with the old power plant which contained two 250 hp and one 500 hp boilers operating at 60 per cent efficiency.

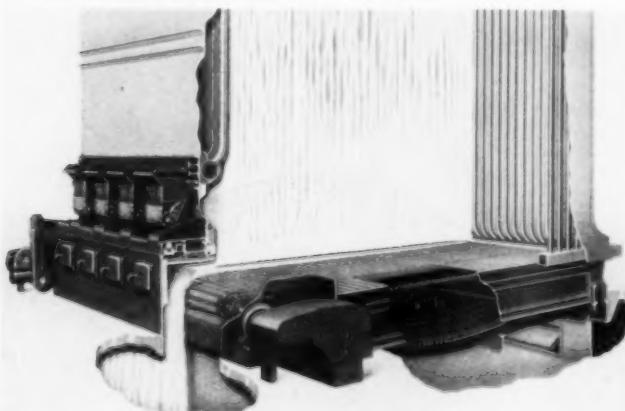
Requirements

Plans for modern and larger steam equipment were being made even then, and in 1946 the new boiler house, with its operating floor some thirty feet above the old one, was started. Everything was streamlined from the truck dump ash hoppers at ground level to the induced draft fan on the roof. The plant was to operate at 85 per cent efficiency at its rated steaming capacity of 80,000 lb/hr. So, to obtain what the plant chief engineer needed, the company investigated the fuels available—coal, oil and natural gas—and built the plant to fit the fuel: Bituminous coal from the southern Appalachian fields.

Equipment Selected

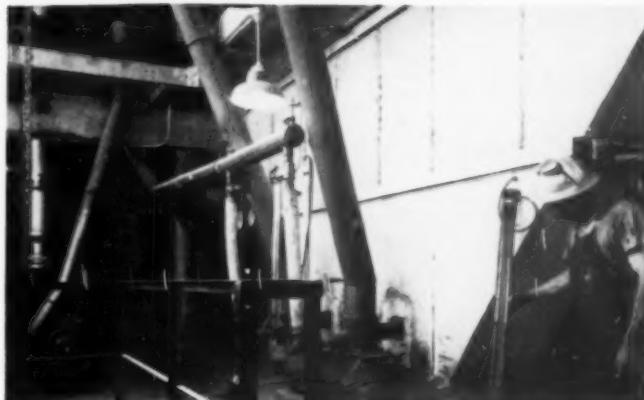
The equipment to deliver the steam had to handle load swings of from 50,000 to 90,000 lb in sudden surges. Coal burning and steaming equipment had to be sensitive to those surges. Selected for this type operation was a Detroit RotoGrate continuous ash discharge spreader stoker, having

Four feeder Detroit RotoGrate stoker showing four-sided waterwall furnace. Grates continuously discharge the ash at the front, permitting high burning rates per square foot of grates.



192.5 sq ft of active grate area capable of standing 360 degrees of air preheat from a Riley single pass down flow air heater with 6,000 sq ft of transfer surface. A Riley R-P type two drum bent tube boiler with 7,885 sq ft of heating surface and with a four-sided water wall furnace, having 1,187 sq ft of tube surface, was installed to give steam to the entire plant and auxiliaries.

For good operating conditions, the furnace was designed with 3,600 cu ft of volume, and—to lessen cinder carry over—the front water wall tubes set on 13½ in. centers were extended through the upper section of the furnace to the top drum, thus acting as a screen and also giving increased steaming. The unburned carbon passing through the boiler is again slowed down in the last pass chamber and a breeching plenum. After the gases pass through the Riley air heater—entering at 525 F and leaving at 360 F—the final job is done by a



Cinder re-injection fan, cinder down spouts and pre-heated air duct carrying 360 degree air to underside of stoker.

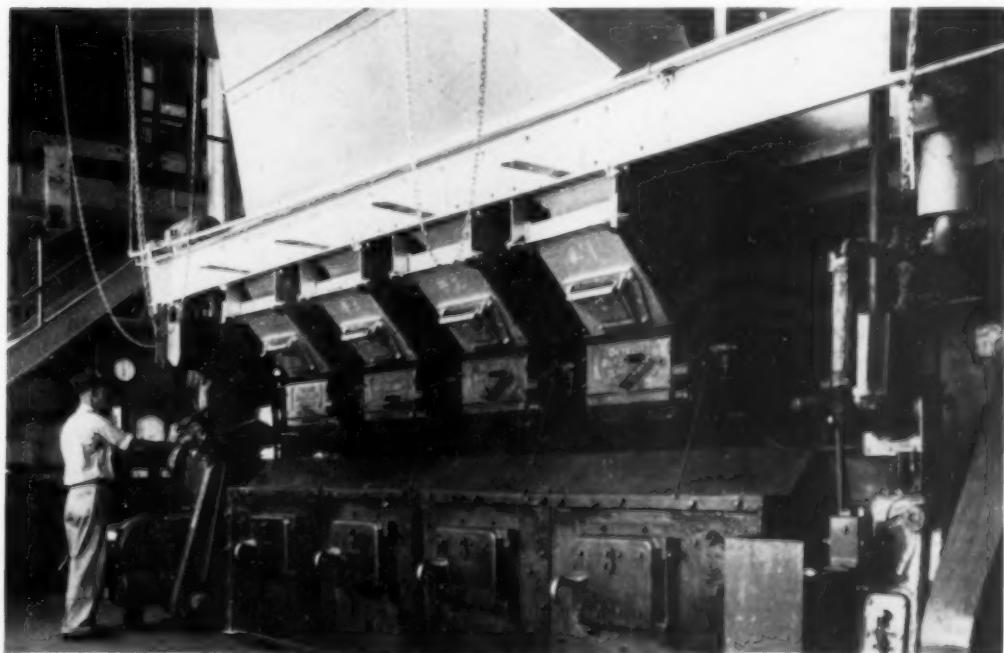
Prat-Daniel "Thermix" induced draft-cinder trap fan. All cinders are carried back through a set of rear pipes and continuously re-injected by high pressure air from a Buffalo Forge fan driven by a Crocker-Wheeler motor.

Since the Sturtevant preheated air forced draft fan is automati-

cally controlled through its Moore steam turbine drive to maintain CO₂ ranging from 11 per cent at low loads to 13 per cent at high loads, clinker and stoker grate bar trouble might be expected. Anticipating this problem, over-grate boiler room temperature forced-

(Continued on page 102)

General view of the operating floor showing front of the Detroit four-feeder RotoGrate spreader stoker, coal down spout, cut-off gates and instrument control panel. Equipment is in the plant of the Calco Division, of American Cyanamid Co., Piney Ridge, Virginia.



Caustic Embrittlement in Boilers Cracking Investigated at High Magnification

The object of this investigation was to reveal the path and progress of embrittlement cracking by use of high magnification.

By H. M. SPRING, JR., Chief Inspector
and J. G. SYLVESTER, Supervising Research Engineer
Mutual Boiler and Machinery Insurance Company.

SO MUCH has been written on caustic embrittlement, it needs no introduction for most of our readers. Briefly, it is an inter-crystalline cracking that may occur in highly stressed areas in a boiler when exposed to high concentrations of sodium hydroxide, and perhaps some silica.

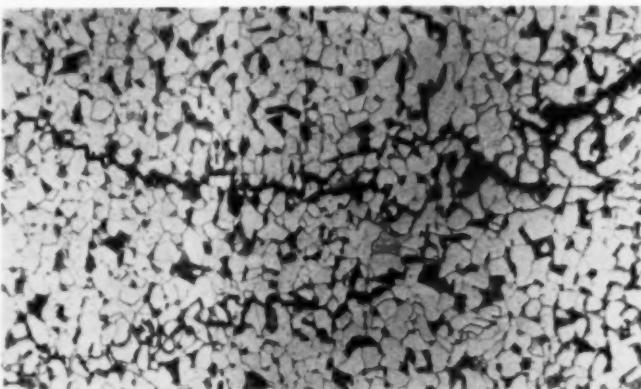
Most previous articles on investigation of caustic embrittlement by photomicrographs have been confined to magnifications of only 100x to 500x. With the thought that some phases of this disease might be overlooked in its physical progress, the current investigation was made at considerably higher magnifications.

The reason for confining most earlier work to lower magnifications was to reveal the general, inter-crystalline path of the crack, Fig. 1.

The object of this investigation was approached with a single purpose; namely, to identify the path and progress of embrittlement cracking as revealed by high magnifications.

Theory

Before studying the photomicrographs, it might be well to discuss briefly a currently accepted theory on the mechanism of caustic embrittlement. The theory is that the polarity existing between the disordered atomic structure of grain boundaries and the orderly lattice structure of the grains, under proper conditions of stress and sodium hydroxide concentration results in a flow of ions from the electro-positive grain boundaries



The general inter-crystalline path of a typical crack is shown in this photomicrograph, 150x, Nital Etch. Majority of investigations have been confined to magnifications of 100x to 500x.

into solution. Hydrogen occlusion may or may not accompany the initial stages of attack.

It is presumed that the corrosive medium is such that corrosion products are immediately dissolved and thereby removed from the anodic areas as they form, allowing the process to continue. This electro-chemical action may be compared to the attack at grain boundaries by etchants used in preparing metallographic specimens for microscopic examination. In the case of embrittlement cracking this progressive action leaves inter-crystalline voids or cracks. It may be readily seen in the photomicrographs which follow that just such an attack is found in the mechanism of embrittlement cracking.

It is perhaps significant that where sodium hydroxide concen-

trations are high, conductivity of the electrolyte (boiler water) is also high. Where sodium nitrate appears in a number of instances to inhibit embrittlement cracking it was first thought that this sodium nitrate might lower the conductivity. Laboratory tests showed that this was not so. Thus, it appears that the sodium nitrate promotes the formation of an insulating film on the metal surfaces.

Considering stress as a factor, it seems conceivable that as high stress is applied to the grains, sufficient lattice distortion may occur so that as physical characteristics develop a change, a change occurs also in the difference in potential existing between the grain boundaries and adjacent grains, thus placing the boundaries at a higher relative positive potential than is present without stress. Consider-

At a magnification of 2000x, we see that of two parallel cracks in the upper portion, that on the left center is of older origin than the one partly surrounding the grain of pearlite, top center. The exception is the fresh crack just starting to encircle the bottom of the small grain of ferrite, left center. It appears to have been arrested by an oxide speck at the lower right corner of the grain.

Note the three abrupt terminations of cracks. This photomicrograph (2000X) is remarkable in that it shows for the first time, we believe, the initial or embryo stages of the apparent encircling action taken by the corrosion. At the left center, the off-shoot to the left between two grains of ferrite is advancing along a normal grain boundary with no oxide or slag spots. At the right center, two cracks are simultaneously converging towards each other.

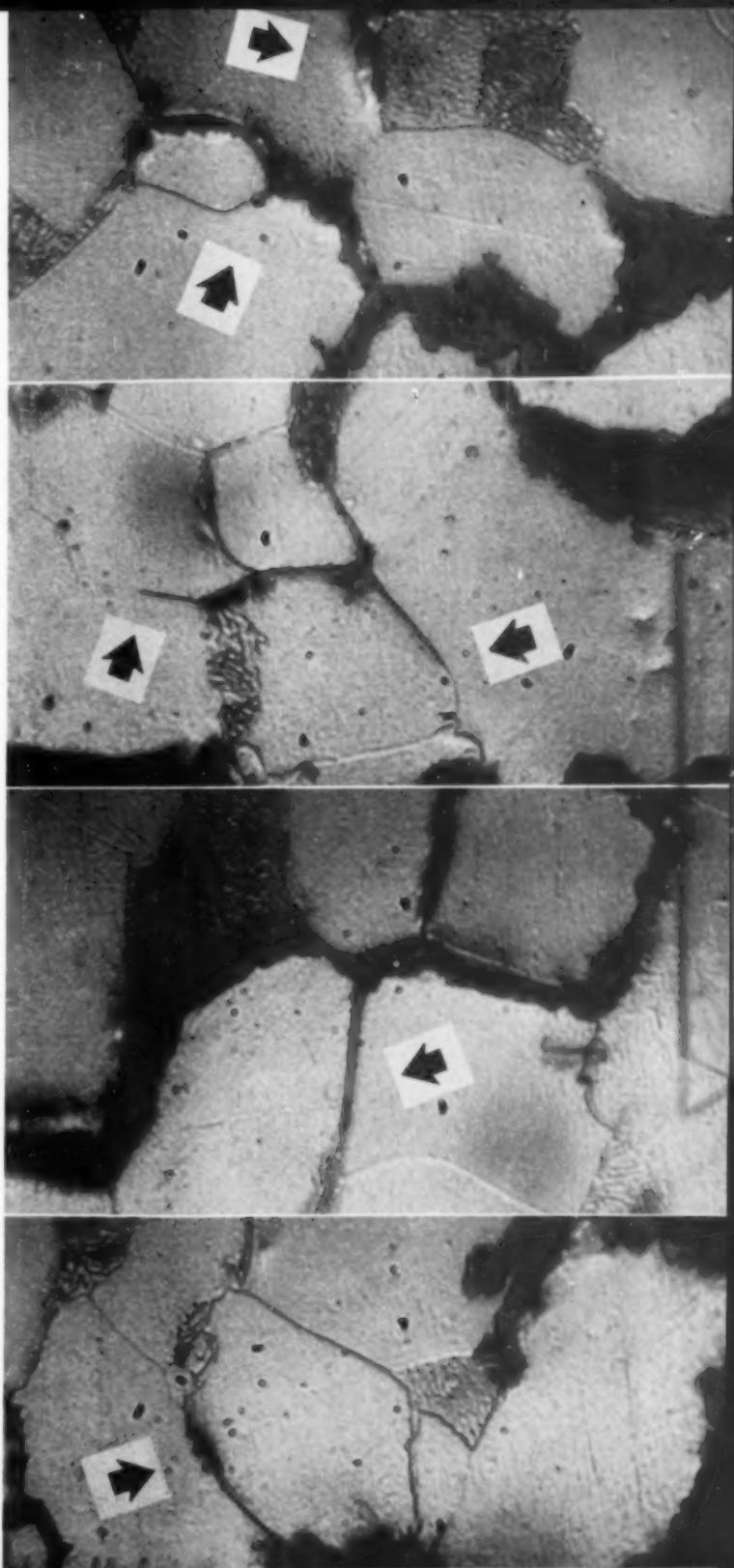
The upper crack is progressing downward towards a five o'clock position while the lower crack, progressing upward on the same grain boundary, ends in an oxide pit, which apparently acted as a temporary "crack arrester" on the plane photographed. These "embryo" cracks are penetrating along a ferrite grain boundary without any special preference for the carbon rich pearlitic areas.

Here the two downward progressing cracks both end in an oxide pit on the plane photographed. All four of these photomicrographs are 2000x Nickel Etch.

There are no well defined terminations of cracks in photomicrograph below. All cracks follow normal grain boundaries, although at the left center, a small crack has been temporarily broadened, indicating apparently slower progress at that point. There is the possibility that an oxide pit temporarily arrested progress.

ing the small anodic grain boundary area relative to the large cathodic areas represented by the grains, it appears possible that preferential and rapid wasting of boundary regions occurs by this mode of attack.

In conclusion it may be said that at the higher magnifications nothing is shown that would disprove the theory suggested earlier in this article. Namely, evidence rather strongly suggests the electrolytic dissolution of grain boundaries into solution in a more or less orderly manner except where grain boundary inclusions temporarily "arrest" the action.



Work Load Assumed by Six-Story Conveyor

"Ferris Wheel" conveyor—a 6-story roundabout tray elevator—affords \$25,000 annual saving and frees freight elevators for other duties.

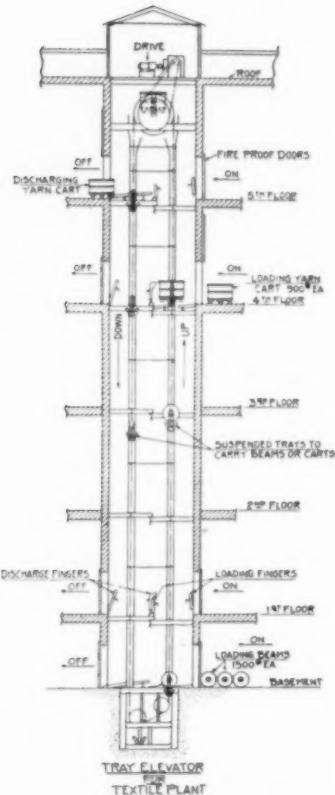
MOVING 1300 lb beams of rayon and 900 lb box trucks in and out of freight elevators is a back-breaking job. Yet approximately 230 of these bulky loads must be lifted (and empties returned) every day at the Firestone Textiles Division of the Firestone Tire and Rubber Co., Gastonia, N. C.

The 6-story roundabout tray elevator has assumed most of the work load. Beams and trucks are automatically picked up on the loading side of a shaftway by trays suspended between two endless chains, carried to the top, eased over the drive sprockets, lowered to the desired floor, and automatically discharged.

THE Firestone Textiles Division saved about \$25,000 per year in handling the beams and box trucks by installing this new conveyor.

Up to twice as many beams can be handled per day and freight elevators are freed for other duties.

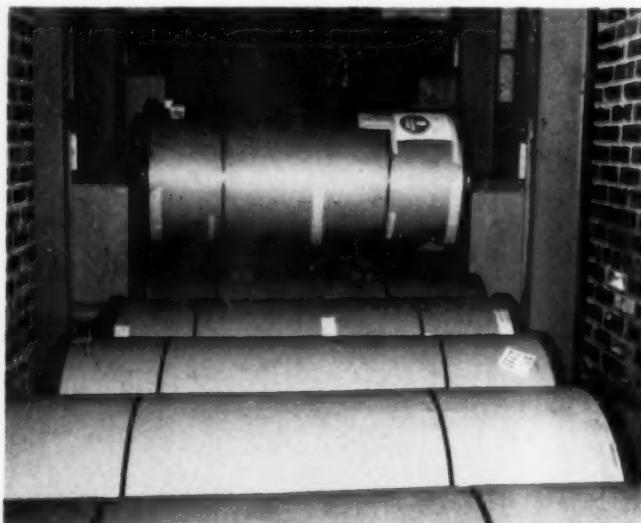
Existing freight elevators were



Schematic diagram of the new Gifford-Wood "ferris-wheel" conveyor at Firestone Textiles Division of the Firestone Tire and Rubber Co., Gastonia, N. C.

already operating on heavy schedules and the beams had to be handled as best they could over the various shifts. About 50 beams per day were handled on this staggered basis whereas with the new system, 80 to 100 beams are handled in one shift. In addition, the conveyor carries 900 lb box trucks between twisting and weaving rooms.

The conveyor, engineered and manufactured by the Gifford-Wood



Six-story conveyor picks up the beams as they are pushed out into the shaftway.

Box trucks of spools are picked up by special platform built on the "tray"—winch at left (not shown) retracts and extends "fingers".

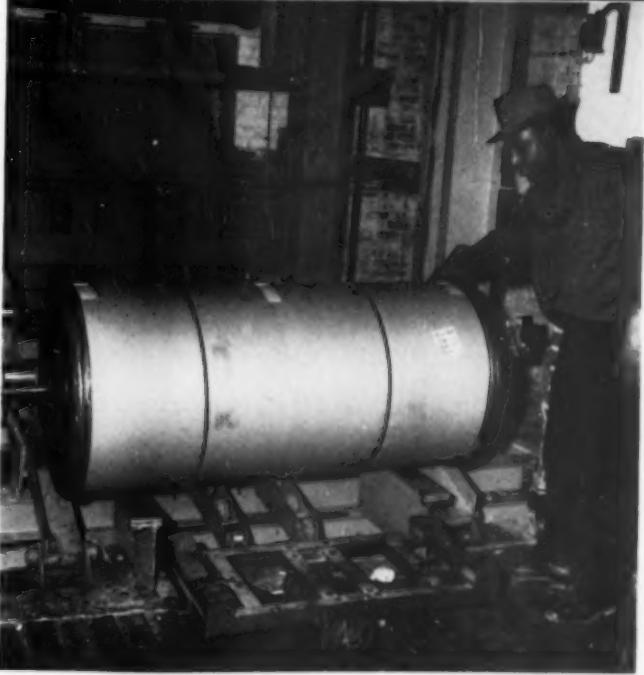
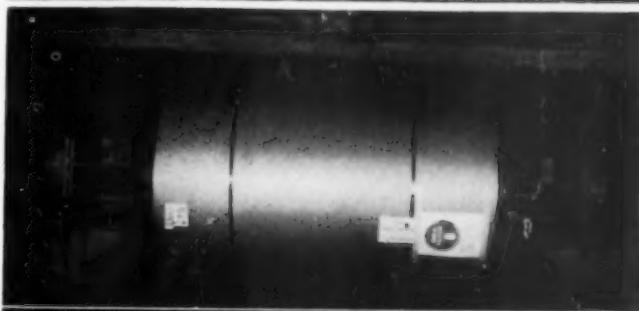
Co., Hudson, N. Y., is installed in a shaft having doorways on two opposite sides. Doors on one side are for loading, those on the other for unloading. In operation, the conveyor resembles an elongated ferris wheel. "Trays" pick up loads on one side of the shaft and carry them up over the top and down along the other side to the proper discharge floor. Trays are suspended 25 ft apart between two parallel roller chains which travel the length of the shaft. Chain-sprockets are driven at the top of the shaft. Of the six floors, the basement, first, fourth, and fifth are served.

When loading, beams are lined up at the door of the conveyor and pushed onto retractable "fingers" extending out into the shaftway. A tray picks up the beam and carries it to unloading-floor fingers where it is deposited and removed to twisting machines. All other fingers are retracted until other floors are to be serviced.

In order for the conveyor to operate, one door must be open on the loading side and one must be open on the unloading side. When ready to start unloading, the attendant at the unloading floor pushes a signal button and the attendant on the basement floor starts the conveyor. Electric-eye controls will stop the conveyor to prevent more than one beam or trucks from being deposited at a time.

Note in the upper photograph how "tray" picks up beams. Beam's axle is engaged by V-shaped channel as tray moves upward. This view was taken from the top of the six story shaft looking down.

Beams are deposited by conveyor on "fingers" which stop beam but allow "tray" to pass on.





The four Hortonspheroids at the Gulf refinery in various stages of completion.

Spheroids Protected on Gulf Coast

FOUR LARGE Hortonspheroids at the Gulf Oil Refinery at Port Arthur, Texas, store butanes at about 50 F. Measuring 280 ft at the maximum outside circumference, the large tanks are constructed with walls of .35"- .56" thick steel. To prevent corrosion and to properly insulate the spheroids, Gulf engineers and the Ther-

Zinc chromate, Foamglas, fibrated asphalt cut-back and aluminum paint afford excellent coating which insulates and provides good corrosive protection.

mal Products Company of Houston, Texas, drew up carefully designed specifications.

To provide a clean surface rough enough to make an excellent bond with a covering of zinc chromate,

Nelson stud welding pins were quickly applied to the vessel surface at predetermined points around the perimeter of the spheroid. Pin arrangement was scheduled so that each 12 x 18 in. block of Foamglas, when laid up with the long edge in a horizontal position, would be supported by two pins.



Application of insulation covering the entire perimeter of the spheroids at the base where the supports were strip-sheeted with 12 gauge metal, is of special interest. Sheets of metal left two 16 in. wide open areas around the base. Note how the Foamglas blocks span the open areas. Here they were turned so that the 18 in. dimension was on vertical plane. The opposite was true on the application of insulation on the vessel.

Foamglas, a product of the Pittsburgh Corning Corporation, not only provides insulating value but also has an unusually high resistance to moisture, being composed of millions of tiny glass bubbles fused together to form a continuous structure.

the spheroids were first sandblasted. Chromate was then sprayed over the vessel. Nelson stud welding pins were then set 9 in. apart on horizontal circles drawn at 12 in. intervals down the curvature of the spheroids. Chromated surface was then given a $\frac{1}{8}$ in. thick spray coat of fibrated asphalt cut-back. Working from the top down, the crew impaled rigid 2 in. thick blocks of Foamglas on the pins. Speed clips were set over the pins



Joints and speed clips were carefully painted with a coat of fibrated asphalt cut-back and an additional coat was sprayed over the entire

area. The final step was to give the spheroid a spray coating of aluminum paint as a weathering agent.

Working from the top down, the insulation crew impaled the rigid 2 in. thick blocks of Foamglas on the pins. Foamglas was set in place using a metal guide to insure that all joints would be tight. At the right a $\frac{1}{8}$ in. thick coat of a fibrated asphalt cut-back is quickly sprayed over the Foamglas.



Complete New Power Plant Meets Specific Needs of Furniture Factory

This completely new small plant is of particular interest because fuel feed equipment and controls assure continuous service from variable waste fuel supply, supplemented by coal.

By DENARD L. GUSLER

Watson and Hart, Mechanical Engineers
Greensboro, North Carolina

A SOUTHERN furniture manufacturing company recently came to the conclusion that it had a very obsolete power plant. Not only was the plant very old and the equipment sadly out of date but it was found that the cost of operating and maintaining the plant exceeded the output in steam and electricity.

The Old Plant

The following situation existed:

1—Three HRT boilers each 150 bhp, 5200 pounds of steam per hour, actually having to generate approximately 9000 pounds of steam per hour, thus loaded to 200 per cent capacity approximately.

2—One engine-generator, 600 kw, 4160 volts, Hamilton-Corliss reciprocating type, with a water rate of 45 lb of steam per kwh or about 27,000 pounds of steam per hour.

3—Combustion control consisted of hand-firing with natural draft. No regulation of fuel flow. Feed-water controlled manually by putting first one boiler on the feed pumps and then the other.

4—Primary fuel was wood refuse in the form of sticks, blocks, sawdust, and shavings. Sawdust and shavings dumped directly into the furnaces as produced in the factory and without regard to boiler steam pressure or load.

Sticks and blocks hand-fired. Boilers continually popping off and wasting steam. Fuel beds two and three feet thick.

5—Supplementary fuel was run-of-the-mine coal in the form of lumps and slack, dumped from a car to a storage area under a railroad trestle, and exposed to the weather. Hand-fired as required to supplement wood refuse. Average 20 tons per week required.

6—Combustion efficiency, about 50 per cent or less.

7—Power required to operate the plant approximated 45,000 kwh weekly. Of this 18,000 kwh was purchased and 37,000 kwh was generated.

Fig. 1. The completed power plant in operation. At one end is the coal silo, bucket elevator, and on the roof are the dust collectors that empty into the wood refuse storage bin. To the left of the stack is a battery of cyclone dust collectors, each handling approximately 50,000 cubic feet of air per minute. Under the separator battery is a relay fan that pneumatically conveys wood refuse to the dust collectors on the roof of the power house.



Fig. 2. One of the vertical, four cylinder, uniflow engines.

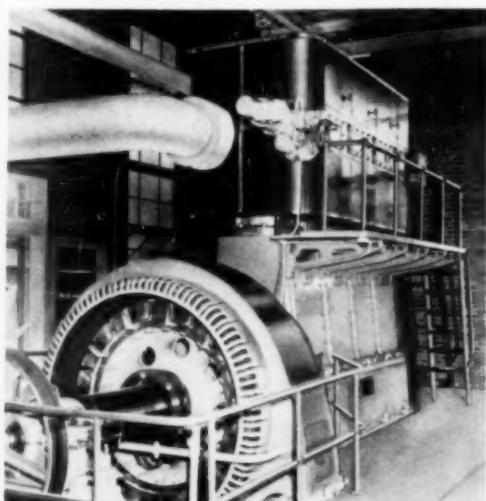




Fig. 3. Left. The first or main floor of the power house, showing fronts of the boilers and the pneumatic stoker arrangement.

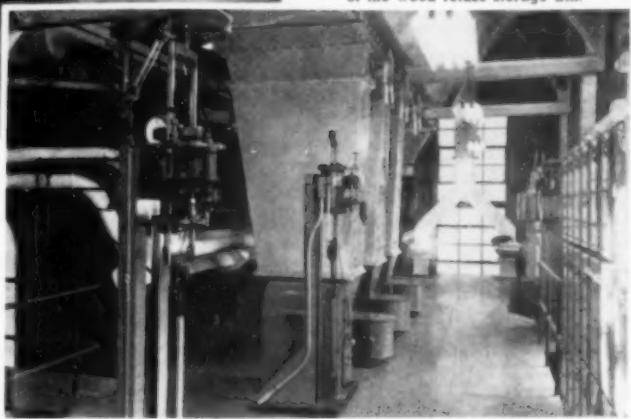


Fig. 4, below. The second or operating floor of the power house. To the right is a motor control center and beyond that is the panel containing the electronic controls for the coal stokers. At the end of the aisle is the chute conveying coal to the hoppers. In the middle of the picture are the three chutes that feed wood to one of the boilers. At the bottom of the chutes are the screw conveyors driven by a variable speed transmission. At the top of the picture is the bottom of the wood refuse storage bin.

The reason for giving consideration to the foregoing items was the desire on the part of the plant management to mechanize the manufacturing process in the factory. The addition of conveyors, mill exhausters, special wood working machinery, and other equipment would greatly overtax the already over-loaded steam and power generating facilities.

The power necessary to operate the modernized factory was estimated to be 75,000 kwh weekly. It was decided that a modern steam and power generating plant would to a large extent eliminate the waste resulting from the operation of the old plant and at the same time would provide all power required for operating the factory after the modernization program was completed.

The New Plant

The new power plant that was built is shown in Figure 1. The principal elements of the new power plant are:

1—Two modern water tube steam generating units capable of 40,000 pounds of steam per hour each. The type of unit selected is shown in Figure 2. The water wall furnaces, fly-ash re-injection, and turbulence created by air jets results in a highly stable furnace that is excellent for burning wood.

2—Two modern, four cylinder, vertical, uniflow engines, each directly connected to a 1250 kw generator. One of the engines selected is shown in Figure 3. The

water rate on this unit with 200 psi at the throttle and 10 psi back pressure is about 34 pounds of steam per kwh.

3—Combustion control consists of a master controller, and fuel-air controllers actuated by the steam pressure. A furnace draft control is provided to maintain the furnace draft at .015 inches of water. Feedwater is controlled mechanically to insure a uniform flow of water as required by the water level in the steam drums and the boiler output in pounds of steam per hour.

4—Primary fuel is wood refuse in the form of sawdust, shavings and hogged refuse, collected in the factory and conveyed pneumatically to a storage bin by distribution conveyors, and conveyed as necessary to the boilers through chutes and screw conveyors. The wood feed arrangements are shown in Figure 4. The speed of the screw conveyors is controlled by the fuel feed controller.

5—Supplementary fuel is coal

of stoker quality, $\frac{5}{8}$ to $1\frac{1}{4}$ inch nut, with very little slack. It is dumped from a car to a hopper. The coal is conveyed from the hopper by a flight conveyor to a coal elevator that lifts the coal to the top of a storage silo where it drops through a chute to a live storage shelf. When the storage shelf is filled to overflowing the coal drops into the silo. A mechanical arrangement is provided for reclaiming the coal from the bottom of the silo by the coal elevator as necessary to replenish the supply of coal on the live storage shelf. From the live storage, the coal drops by gravity to the hoppers of pneumatic stokers. The pneumatic stokers are shown in Figure 5.

6—Combustion efficiency is raised to approximately 78 per cent, resulting in about 40 per cent improvement, and a great saving in wood refuse fuel. The efficiency curve as determined by load tests is shown in Figure 6.

7—The new power plant is able

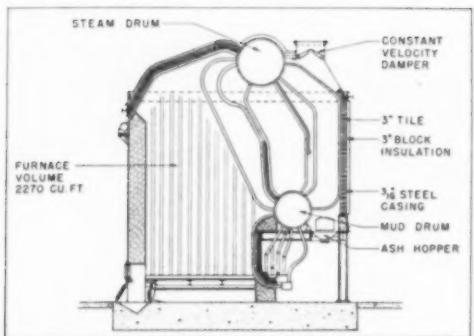


Fig. 5. A cross section through the boiler.

Fig. 6. Curves that show the ratio of wood in pounds per hour to steam output in pounds per hour. Also shown are the corresponding efficiency and CO₂ percentage at various boiler loadings.

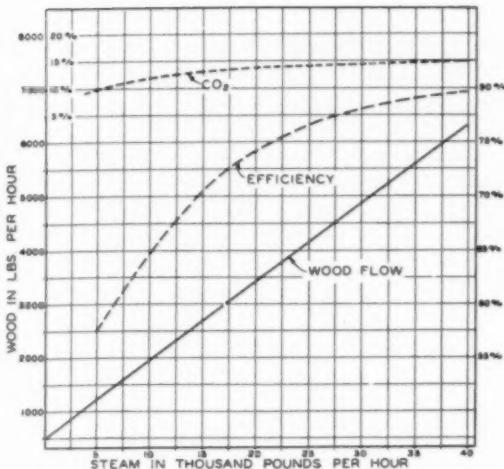
to generate more than the power required for the factory with wood refuse alone and it is possible to sell the surplus power to the community in which the factory is located.

8—The sale of surplus power plus the necessity for continuity of operation in case of failure of the flow of wood refuse dictated

the installation of the coal stokers and coal handling equipment.

9—The estimated savings have amounted to approximately \$40,000 yearly in operation, purchased power, and coal purchased. This will pay for the new power plant in approximately ten years.

10—The new power plant has proved to be an excellent invest-



ment, and the plant management is satisfied that using wood waste for power generation is economically sound provided it is done efficiently as heretofore described.

Combustion Control

The combustion control system that was finally installed is shown schematically and explained in some detail. Not shown, however, is the master control panel which is equipped with the following instruments to assist in visual and recorded control of operations:

Per boiler

Undergrate pressure indicator.

Furnace draft indicator.

Uptake draft indicator.

Steam flow in lb per hour, indicated, integrated, and recorded.

Steam pressure, indicated and recorded.

CO₂ indicated and recorded.

Master combustion controls and control relays.

The combustion control panel as described is located in the engine-generator room in the vicinity of the electric switchgear. This location makes it possible for the plant engineer, a highly skilled and trained operator, to have complete control of the power plant at all times under normal operating conditions. He is assisted by a fireman who remains in the operating vicinity of the boilers which are on the operating floor or second floor of the power plant. He is in front of the boilers and the motor control center.

PRINCIPAL EQUIPMENT

Boilers	Two, Union Iron Works Co., type O, 40,000 lb per hr capacity with water cooled sidewalls and rear water walls. Design pressure 250 psig. Steel encased, stationary plenum type grates.
Stokers, Coal	Four, two per boiler, Iron Fireman pneumatic spreader type, capacity 4000 lb per hr per boiler.
Boiler Feed Pumps	Two, American Marsh duplex reciprocating type, operating with steam at 200 psig, exhausting at 10 psig, capacity of 40,000 lb per hr each.
Generating Heater	Cochrane Corp., tray type having a capacity of 80,000 lb per hr with water in at 55 F and out at 230 F.
Forced Draft Fans	Six, three per boiler, Iron Fireman volute type. One to each of three plenum chambers under the grates of each boiler. Each fan driven by a 3 hp motor.
Panel Board and Meters	Hays Corporation.
Combustion Control	Hagan Corporation.
Electronic Stoker Speed Controls	Louis-Allis Corporation.
Feedwater and Pump Regulators	Copes Flowmatic, Northern Equipment Company.
Wood Storage and Transport System	Fairfield Engineering Company, Marion, Ohio.
Wood Stokers	Link Belt Company.
Coal Storage and Transport System	Fairfield Engineering Company, Marion, Ohio.
Steam Engines	Two, Skinner Engine Company, vertical, multicylinder, uniflow, rated at 1500 bhp each. Design pressure 200 psig at throttle, 10 psig exhaust, 327 rpm.
Generators	Two, Elliott, 1250 kva, 4160 volts, 3 phase, 60 cycle.
Switchgear	General Electric Company, dead front, totally enclosed, battery operated.
Continuous Blowdown	Cochrane Corporation.
Chemical Feed System	Milton Roy Company.
Dust Collectors and Piping	The Kirk and Blum Co., Cincinnati, Ohio.

The mechanical arrangements are such that the plant engineer can observe the boilers from the engine room and operate them either automatically or manually

as necessary. In case of emergency, the fireman can start up, operate, or shut down the boilers from the operating platform by disengaging the linkages that pro-

vided the automatic control.

The fireman has control of the hand-off-auto switches and is provided with the following instruc-

(Continued on next page)

The Combustion Control and How It Operates

THE COMBUSTION control system shown here functions as follows: Steam pressure from the main steam manifold operates a master combustion control to vary air loading pressure in proportion to a change in the steam pressure which is generally set to maintain 210 psig with a maximum variation of plus or minus 4 pounds.

The loading pressure from the master control of wood fuel travels to the control relay. The loading pressure from the control relay can be the same as that from the master control or a proportion of the master control pressure or it can be regulated manually. The control pressure operates a wood feed regulator that is essentially a pneumatically operated piston with a ten inch stroke, and compensating features. The regulator controls a variable speed transmission that drives the wood stokers.

It should be noted that the wood control relay loading pressure operates a damper that proportions the wood distribution air. This air is in the form of a high velocity jet located under the chute from each stoker that dumps wood refuse into the furnace. This loading pressure also operates the forced draft air damper regulators. A

three way magnetic transfer valve is in parallel with the operating coil of the wood stoker that dumps wood refuse into the furnace. This loading pressure also operates the forced draft air damper regulators. A three way magnetic transfer valve is in parallel with the operating coil of the wood stoker motor switch so that when the operating coil is energized the loading pressure from the coal control relay is blocked off and passage is permitted for the wood control relay loading pressure.

The coal control relay loading pressure functions to operate a coal regulator feed as described for the wood feed regulator. In this instance, however, the regulator positions a rheostat which in turn controls the excitation of an induction motor driven magnetic clutch that drives the coal stokers.

The arrangement is such that the electronic ac-dc rectifier is energized continuously during the operating period. However, the excitation is not applied to the magnetic clutch unless the coal stoker switch is operated to start the coal stoker motor.

To further describe certain functions of the system, different operating conditions must be set up as shown beside the diagram.

Examples

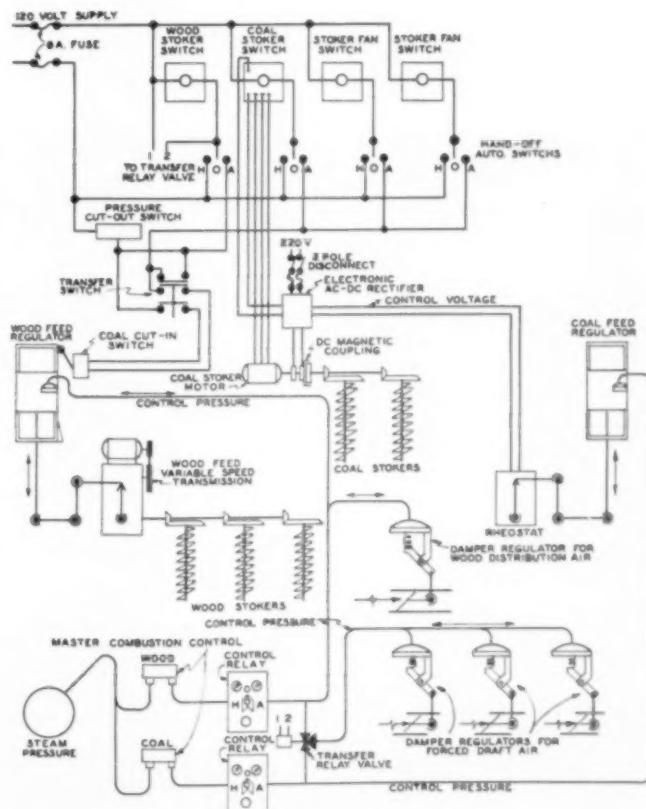
Condition 1—Boiler on wood refuse, wood control relay on automatic, transfer switch in down position, hand-off-auto switches on automatic, coal control relay on manual and set for 20 per cent of coal feed firing rate.

In the event that a failure of wood feed occurs on one of the wood stokers the regulator will travel up to a maximum demand position. This position causes a cam to engage the operating arm of the coal cut-in switch. This starts the coal stoker and the stoker conveying fans thus supplying coal to the furnace at 20 per cent of normal coal firing rate which is an amount that will supplement the insufficient wood. When the wood feed is restored the regulator travels down and the coal stoker cuts off.

Condition 2—Same as condition 1. A complete failure of wood refuse supply occurs. The coal stoker starts up as described for condition one. The fireman moves the transfer switch to the up position and as the stoker fire is established the plant engineer transfers the coal control relay to automatic. The fireman shuts down the wood stoker switch, thus de-energizing the transfer relay valve and putting the forced draft damper regulators on the coal control relay loading pressure. This condition establishes the proper ratio of air for coal firing.

Condition 3—Transfer switch in up position, wood stoker switch off, wood control relay on automatic.

The fireman decides to transfer back to wood refuse firing. He moves the transfer switch to the down position and puts the wood stoker switch to the down position and puts the wood stoker switch on automatic. This operation cuts off the coal stoker and the plant engineer then transfers to manual, and twenty per cent loading on the coal control relay.



mentation to assist in his operation:

Per boiler

Steam pressure gauge.

Undergrate pressure indicator.

Furnace draft indicator.

The operating arrangements that have been described are extremely satisfactory and afford adequate proof that the combustion control panel does not have to be in front of the boilers and under the control of the firemen even in a small plant.

Design Considerations

The design of this plant, as is the case with most plants of this size, consisted mainly in the selection of the proper equipment of standard makes and types. There were, however, two problems that were unique and difficult of solution. One was selecting the proper system for handling and storing wood refuse without arching in the storage bin; and the other problem was that of providing a combustion control system that would adequately control the flow of wood or coal into the furnaces with the proper proportion of air for combustion.

It was necessary to devise a control system that would be automatic in operation to provide maximum combustion efficiency and yet not require highly skilled operating personnel. It was also necessary to provide maximum continuity of operation because a shutdown in the power plant means a shutdown in the factory and a failure of this type would be very costly.

Another factor was the decision to operate the power plant with a minimum of personnel, since one of the substantial savings that would result from the modernization program would be reduction in attendance.

The reader may feel that the operation described has definite limitations in that the automatic operation is somewhat dependent on the operators, which is of course true. It is the opinion of this writer that some phases of the operation must always be the definite responsibility of the operator in order that the operator may be alert and capable. The truth of this is borne out in the fact that in three other power

plants in which the described mechanical arrangements are installed, there has never been a power plant shut-down due to fuel failure, and these plants have been in operation over two years.

It would, of course, be practical to have a more automatic opera-

tion if oil or gas were used as the standby fuel because a definite time lag must ensue for the establishment of a stoker fire. Economy, however, dictated the selection of coal and the simple stoker method of firing. The results have exceeded expectations.

Heater Drain Piping Deterioration

Object of this discussion, starting on page 67 is to give power engineers a better understanding of the causes of deterioration of heater drain piping.

Comments have been prepared by Louis S. Gee, Engineer, Production Department, West Texas Utilities Company, Abilene, Texas.

oxide is the bicarbonate and carbonate alkalinites of the make-up water to the boilers. The bicarbonate and carbonate alkalinites where subject to boiler temperature undergo thermal decomposition and liberate carbon dioxide which becomes entrained with the steam. A portion of the liberated carbon dioxide enters the heaters with the extracted steam and that which is not vented off is carried out with the heater drains.

Under an inspection, a section of deteriorated heater drain piping which has been destroyed by oxygen corrosion will appear much different from pipe damaged by erosion. This is not true of piping deterioration as a result of carbon dioxide corrosion. Carbon dioxide is the usual cause of steam and return line corrosion. This corrosion is characterized by general thinning of the pipe wall or grooving along the bottom of the pipe. As has been stated before deterioration of straight lengths of pipes are generally caused by chemical action, not erosion. It is true, however, that a chemically corrosive environment can accelerate damage to a metal by cavitation.

Prevention and Repairs

To prevent deterioration of heater drain lines, they should be sized according to the latest design criteria. The most effective way of reducing erosion difficulties is to sub-cool the heater drains to temperatures below those corresponding to saturation temperatures at existing pressures. If sub-cooling is not economical the control valves should be placed at

the end of the drain lines instead of at the heater from which the drains come. If these steps are not possible consider the elimination of as many bends as possible, and the use of valves in which direct impingement does not take place.

Areas damaged can be replaced with dense high-tensile strength materials. The chromium stainless steels, including those with nickel components have proved superior. Reforming of eroded surfaces by chipping may slow down or eliminate the damage. Coatings of resilient materials such as Neoprene, etc., have been applied and they have successfully reduced or eliminated cavitation erosion.

It must be remembered that much of the drain piping deterioration is caused by corrosion. Oxygen corrosion may be stopped by preventing air leakage into the return system. Since carbon dioxide is generated in the boiler it must be neutralized to prevent drain line corrosion from this cause. It is possible to elevate the pH of the extracted steam and to neutralize the carbonic acid formed by carbon-dioxide with alkaline materials. Neutralization of carbonic acid can safely be accomplished by volatile amines such as cyclohexylamine, $C_6H_{11}NH_2$. These amines are fed to the boiler and are volatilized by heat and pass from the boiler with the steam. The amines combine with the carbon dioxide in the condensate to neutralize its acidity. An amine such as cyclohexylamine in low concentration is not corrosive to copper and zinc bearing metals. Ammonia is very corrosive to copper and zinc and should not be used.

POWER SHOW

20th National Exposition of Power and Mechanical Engineering

THE 20th National Exposition of Power & Mechanical Engineering will be held at the Grand Central Palace, New York, N. Y., the first week in December. This date coincides with the annual meeting of ASME at the Statler Hotel, where technical advances of revolutionary nature will be under review.

Engineers foresee a doubling of gas consumption within the next decade or two, and competitive improvements in the treatment and combustion of coal to enhance the position of that fuel in regions where it is readily available. Many improvements in power plant economy are being fostered to offset the rising tide of

The 20th National Power Show, Grand Central Palace, New York, N. Y., December 1 to 6, 1952, will feature 317 different kinds of products. Over 344 manufacturers will be represented to show you the latest equipment, materials, and methods for power production, distribution and use.

power costs, and many of these will immensely benefit the economy of the elder and smaller installations.

One exhibitor will show centrifugal castings of special alloys for jet engines, including a difficult silicon-iron

bronze cage blank, cast and hot worked, for anti-friction bearings to be in jet aircraft.

Another exhibit will be focussed on a high pressure gate valve with breech-lock seal-welded body-hornet



20th National Power Show (continued)

connection, typical of the high pressure, high temperature equipment being furnished to steam generating stations throughout the country. Some of the installations of this type are run at temperatures so high that the valves take on a dull red glow.

Other Exhibits

Development of a new 4-in. tube by a manufacturer of dust collectors permits smaller sized equipment to be assembled, which can be installed in plants where space limitations have prevented the use of such equipment in the past. The exhibit will feature

an animated display showing fly ash being separated for re-firing.

Another dust collector will be demonstrated in action, showing how dust is collected through the aid of 2,000 slotted perforations in each tube. An installation of this type has recently gone into use on a boiler capable of converting 500 tons of water per hour into steam. It handles 450,000 cfm of flue gas at 325 F with a draft loss of only 0.70 in. wg., and is installed ahead of an electrostatic precipitator, which is intended to trap the small proportion of fly ash that escapes the first collector.

ASME Annual Meeting

"Building for the Future" is the theme for the 1952 Annual Meeting of the ASME, scheduled for the Hotels Statler and McAlpin, New York, November 30-Dec. 5, 1952. The 20th National Power Show is under the auspices of The American Society of Mechanical Engineers in conjunction with the Annual Meeting of the Society.

Frederick S. Blackall, Jr., president and treasurer of the Taft-Pierce Manufacturing Co., Woonsocket, R. I., will be installed as 1953 president of the ASME; and *Paul R. Yopp*, district sales manager, the Babcock & Wilcox Co., Atlanta, Georgia, and *Harry Pearson*, Personnel Director, Dallas Power & Light Co., Dallas, Texas, will be installed as regional vice-presidents.

MANUFACTURERS EXHIBITING AT POWER SHOW

Exhibitor	Booth No.	Exhibitor	Booth No.
A			
<i>Aero Corporation</i> , 214 Lafayette Place, Englewood, N. J.	432	<i>BAILEY METER COMPANY</i> , 1650 Ivanhoe Road, Cleveland 16, Ohio	54-55
<i>Aerodyne Division of The Green Fuel Economizer Co., Inc.</i> , 700 Main St., Beacon, N. Y.	71	<i>Banning, A.G., Jr.</i> , 59 Church St., New York 7, N. Y.	482
<i>Aerotec Corporation, The</i> , Pemberwick & Comley Ave., Greenwich, Conn.	51	<i>Barco Manufacturing Company</i> , 1801 W. Winnemac Ave., Chicago 46, Ill.	516-517
<i>Alkon Products Corp.</i> , 698 E. 142nd St., New York, N. Y.	545-546	<i>Barkley Electric Manufacturing Co.</i> , Middletown, Ohio	508-509-510-511-512-513
<i>Allen Co., A. K.</i> , 57 Meserole Ave., Brooklyn, N. Y.	545-546	<i>Barnes & Jones, Inc.</i> , 128 Brookside Ave., Jamaica Plain, Boston, Mass.	420
<i>ALLEN-BRADLEY COMPANY</i> , 118 W. Greenfield Ave., Milwaukee 4, Wis.	265-267-209-211-213	<i>Barrett-Crawley Company</i> , 6018 S. Western Blvd., Chicago 9, Ill.	78
<i>ALLIS-CHALMERS MANUFACTURING COMPANY</i> , Box 512, Milwaukee 1, Wis.	3-4-5	<i>Beemer Engineering Company</i> , 401 North Broad St., Philadelphia 8, Pa.	347-348
<i>Allis Co., The Louis</i> , 427 E. Stewart St., Milwaukee 7, Wis.	320-322	<i>BELCO INDUSTRIAL EQUIPMENT DIVISION, INC.</i> , 52 Iowa Ave., Paterson 3, N. J.	235
<i>American Brass Company, The</i> , Waterbury 88, Conn.	56-57	<i>Belgian Electric Sales Corporation</i> , 1 East 53rd St., New York 22, N. Y.	528-529
<i>American Cystoscope Makers, Inc.</i> , 1241 Lafayette Ave., New York 50, N. Y.	444	<i>Beltran Associates, Inc.</i> , 225 Lafayette St., New York 12, N. Y.	446
<i>American District Steam Company, Inc.</i> , North Tonawanda, N. Y.	280	<i>Bergen Pipe Support Corp.</i> , 58 Church St., New York 7, N. Y.	418
<i>American Fullmax Company, Inc.</i> , 2455 N. Sheffield Ave., Chicago, Ill.	409-410	<i>Berry Division, Oliver Iron and Steel Corporation</i> , South 10th & Morris Sts., Pittsburgh 3, Pa.	433
<i>American Society of Mechanical Engineers, The</i> , 29 West 39th St., New York 18, N. Y.	80	<i>BEST COMBUSTION EQUIPMENT CO., INC., W. N. N.</i> , 411 Eleventh St., Carlstadt, N. J.	556-557
<i>A.S.M.E. Mechanical Catalog and Directory</i> , 29 West 39th St., New York 18, N. Y.	80	<i>Biddle Co., James G.</i> , 1218 Arch St., Philadelphia 7, Pa.	554
<i>AMES IRON WORKS, INC.</i> , Oswego, N. Y.	72	<i>B-I-F Industries</i> , 345 Harris Ave., Providence, R. I.	93-94
<i>Amico Metal, Inc.</i> , 1745 S. 39th St., Milwaukee 15, Wis.	229-231	<i>Bignal & Keefer Company</i> , 4591 McRee Ave., St. Louis 10, Mo.	407-408
<i>Amplex Manufacturing Company, Subsidiary of Chrysler Corporation</i> , Box 2718, Detroit 31, Mich.	547-548	<i>Black & Decker Mfg. Co., The</i> , Towson 4, Md.	533-534
<i>ANDERSON COMPANY, THE V. D.</i> , 1936 W. 96th St., Cleveland 2, Ohio	83-84	<i>BLACKBURN-SMITH MANUFACTURING CO., INC.</i> , 55 River St., Hoboken, N. J.	76
<i>ARMSTRONG MACHINE WORKS</i> , Three Rivers, Mich.	330-332	<i>Bolenz & Schafer</i> , 50 Church St., New York 7, N. Y.	482
<i>ARMSTRONG STEAM TRAP COMPANY</i> , Three Rivers, Mich.	330-332	<i>Bond Company, Charles</i> , 617 Arch St., Philadelphia 6, Pa.	221-223
<i>Arrow-Hart & Hegeman Electric Co., The</i> , 105 Hawthorne St., Hartford 6, Conn.	555-560	<i>Boston Gear Works Div. The Murray Co. of Texas, Inc.</i> , Quincy 71, Mass.	287
<i>Arrow Tools, Inc.</i> , 1900 South Kostner Ave., Chicago 23, Ill.	545-546	<i>Bowser, Inc.</i> , 1302 E. Creighton Ave., Fort Wayne 2, Ind.	561-562
<i>Ashton Valve Company</i> , 43 Kendrick St., Wrentham, Mass.	59	<i>Brady Conveyors Corp.</i> , 20 W. Jackson Blvd., Chicago, Ill.	493-494-495
<i>Atlantic Gear Works, Inc.</i> , 200 Lafayette St., New York 12, N. Y.	389	<i>Brown Bovery Corporation</i> , 19 Rector St., New York 6, N. Y.	36-37
<i>Atlantic Transmission & Gear Sales, Inc.</i> , 200 Lafayette St., New York 12, N. Y.	391	<i>Buell Engineering Company, Inc.</i> , 70 Pine St., New York 5, N. Y.	72
<i>ATLAS VALVE COMPANY</i> , 280 South St., Newark 5, N. J.	222-224	<i>Buffalo Meter Company</i> , 2917 Main St., Buffalo, N. Y.	69
<i>Automatic Switch Company</i> , 391 Lakeside Ave., Orange, N. J.	550-551	<i>Builders Iron Foundry</i> , 345 Harris Ave., Providence, R. I.	93



POWER SHOW - PLAN OF FIRST FLOOR

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Builders-Providence, Inc. 345 Harris Ave., Providence, R. I.	93-94	Clayton Manufacturing Company. Box 550, El Monte, Calif.	214-216
Butler Engineering Company of New York. Foot of 26th Ave., Brooklyn 14, N. Y.	475	CLEAVER-BROOKS COMPANY. Milwaukee 12, Wis.	7 W
C—		Clements Mfg. Co. 6650 S. Narragansett Ave., Chicago 38, Ill.	563
Cab Design Corporation. 11-08 131st St., College Point 56, N. Y.	500	Cleveland Worm and Gear Company, The. 3249 E. 90th St., Cleveland 1, Ohio.	19
Cambridge Instrument Company, Inc. Grand Central Terminal, New York 17, N. Y.	381-383	Cleworth Publishing Company, Inc. 551 Fifth Ave., New York 17, N. Y.	475
Carey Manufacturing Company, The Philip Lockland, Cincinnati 15, Ohio	241	Clinton Machine Company, Metalmaster Division Clinton, Mich.	414
Carlson Company, The. 277 Broadway, New York 7, N. Y.	481	Clipper Belt Lacer Company, Grand Rapids 2, Mich.	315
CHAPMAN VALVE MANUFACTURING COMPANY, THE. 203 Hampshire St., Indian Orchard, Mass.	46-47	COEN BURNER SALES COMPANY. Weehawken, N. J.	226-228
Chem-Therm Manufacturing Company. Monrovia, Calif.	526	COEN COMPANY. Box 7, Union City, N. J.	226-228
Chemiquip Company. 6 East 97th St., New York 29, N. Y.	575A	Commander Manufacturing Co. 4225 W. Kinzie St., Chicago 24, Ill.	485-486-487
Chicago Tool and Engineering Co. 538 S. Chicago Ave., Chicago 17, Ill.	491	CONDENSER SERVICE & ENGINEERING CO., INC. 95 River St., Hoboken, N. J.	76
Chiksan Company. Brea, Calif.	454-455	Congress Drives Division—Tann Corp. Detroit, Mich.	457-458
Cities Service Oil Company. 70 Pine St., New York 5, N. Y.	361-366-368	CRANE CO. 836 S. Michigan Ave., Chicago 5, Ill.	53
Clark Controller Company, The. 1146 E. 152nd St., Cleveland 10, Ohio	554-555	Crosby Steam Gage & Valve Company. 43 Kendrick St., Wrentham, Mass.	59
Clark Manufacturing Company, The. 1830 E. 38th St., Cleveland 14, Ohio	564	Cullman Wheel Co. Chicago, Ill.	487-488
		Custodis Construction Company, Inc. 25 Broadway, New York 4, N. Y.	217-219
		Cutler-Hammer, Inc. 315 N. 12th St., Milwaukee 1, Wis.	291-293
		CYCLOTHERM DIVISION, UNITED STATES RADIATOR CORPORATION. 157 E. First St., Owego, N. Y.	15 C

20th National Power Show (continued)

Exhibitor

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Exhibitor	Booth No.
Dampney Company, The, Hyde Park, Boston 36, Mass.	62
Danish Transmission Co., 148 Baxter St., New York 13, N. Y.	427-458
Davis Aircraft Products 1191 Spafford Ave., New York 59, N. Y.	500
Dayton Rubber Company, The, Dayton 1, Ohio	297
De Laval Separator Company, The, Poughkeepsie, N. Y.	92
DeZurik Shower Company, Sartell, Minn.	305
DeALL Eastern Company, Inc., 67 Lexington Ave., New York 10, N. Y.	496-497
DeALL New Jersey Co., Inc., 88 Park Ave., Nutley, N. J.	496-497
DOWELL INCORPORATED, Kennedy Bldg., Box 536, Tulsa 1, Okla.	423-424
Dreis & Krump Manufacturing Company, Chicago, Ill.	479-480
Durametallite Corporation, 2104 Factory St., Kalamazoo 24, Mich.	501

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EAGLE-PICHER SALES COMPANY, THE, 900 American Bldg., Cincinnati 1, Ohio	324-326
Eagle Signal Corporation, Moline, Ill.	508-509-510-511-512-513
Eberhardt-Denver Company, 1408 W. Colfax Ave., Denver 4, Colo.	467
Edge Moor Iron Works, Edge Moor, Del.	76
EDWARD VALVES, INC., 1290 W. 145th St., East Chicago, Ind.	26-27
Eiche & Associates, Inc., R. J., 30 Church St., New York 7, N. Y.	471
Elastic Stop Nut Corporation of America, 2330 Vanshall Road, Union, N. J.	531-532
Electric Auto-Lite Company, The, Toledo 1, Ohio	289
Electric Controller & Mfg. Co., The, 2790 E. 79th St., Cleveland 4, Ohio	427-428
Electric Regulator Corporation, Norwalk, Conn.	473
Electrical World, 339 W. 42nd St., New York 36, N. Y.	244
Electro Arc Manufacturing Company, Box 448, Ann Arbor, Mich.	400-409A
Elektrite Products, Inc., 110 E. 42nd St., New York 17, N. Y.	572 A
Energy Control Company, Inc., 5 Beckman St., New York 38, N. Y.	69
Ernst Water Column & Gage Company, 250 S. Livingston Ave., Livingston, N. J.	A-Main
EVERLASTING VALVE COMPANY, 49 Fisk St., Jersey City 5, N. J.	41
Excel Electric Service Company, 2113 S. Western Ave., Chicago 8, Ill.	461 A

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Faessler Mfg. Co., J., Mobile, Mo.	248
Fairbanks Company, The, 333 Lafayette St., New York 3, N. Y.	78
FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.	264-266-268
Fairfield Engineering Company, The, 324 Barnhart St., Marion, Ohio	312-314
Falstrom Company, Falstrom Court, Passaic, N. J.	543-544
Famco Machine Company, 18th and Holborn Sts., Racine, Wis.	537-538-539
Farris Engineering Corporation, Palisades Park, N. J.	319
Farris Flexible Valve Corporation, Palisades Park, N. J.	319
Farris Hydrotorque Corporation, Palisades Park, N. J.	323
Farris Staeger Corporation, Palisades Park, N. J.	319
Farval Corporation, The, 3249 E. 80th St., Cleveland 4, Ohio	19

Exhibitor

Booth No.

Federal Electric Products Company, 50 Paris St., Newark 5, N. J.	342-344
Federal Machinery Company, 134 Grand St., New York, N. Y.	479-480
Flexible Tubing Corporation, Guilford, Conn.	507
Flexitallic Gasket Company, 8th & Bailey Sts., Camden, N. J.	286
Flexonics Corporation, Maywood, Ill.	350-352
Flexoseal Company, Packing Division, 50th & Filbert Sts., Philadelphia 4, Pa.	470
Foley Manufacturing Company, 3309 Fifth St., N.E., Minneapolis 18, Minn.	299
FOSTER ENGINEERING COMPANY, 833 Lehigh Ave., Union, N. J.	38-39
Foxboro Company, The, Foxboro, Mass.	91
Fuller Company, Fuller Bldg., Catawissa, Pa.	250-252-254
Furnas Electric Co., Batavia, Ill.	508-509

—G—

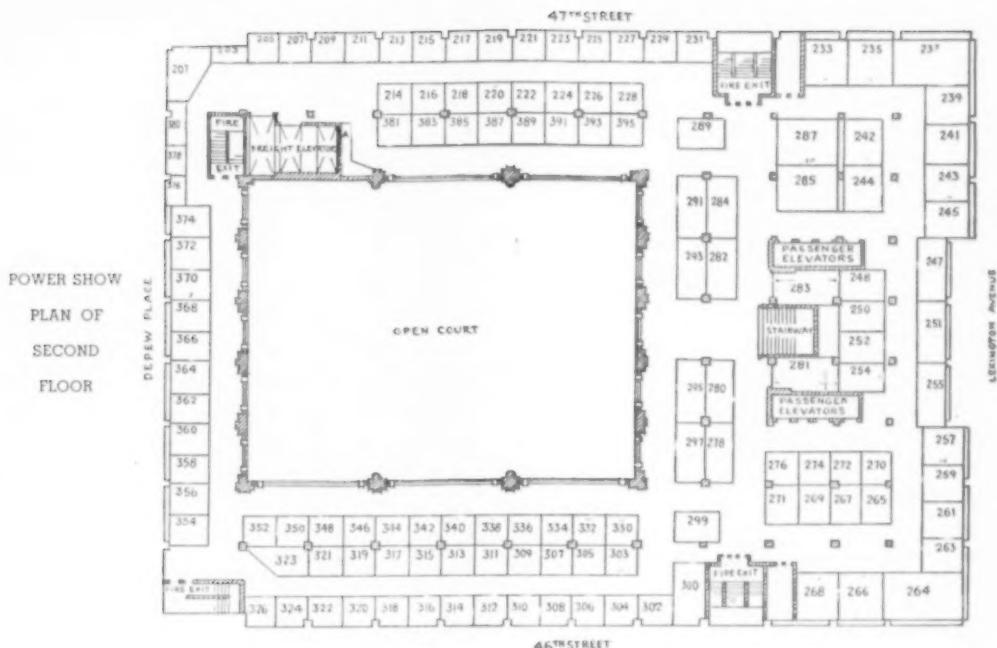
GARLOCK PACKING COMPANY, THE, Palmyra, N. Y.	278
General Controls Co., 801 Allen Ave., Glendale 1, Calif.	340
General Power Plant Corporation, 10 St. Paul's Place, Ossining, N. Y.	233
Gerbing Manufacturing Corp., 11800 Milwaukee Ave., Northbrook, Ill.	437-438
Gilmer Belts Inc., 1 Market St., Passaic, N. J.	505
Globe Steel Tubes Co., 3339 W. Burnham St., Milwaukee 46, Wis.	370-372
Gordon Company, James T., Woolworth Bldg., New York 7, N. Y.	19
Graham Transmissions, Inc., Menomonie Falls, Wis.	425-426
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Hungerford & Terry, Inc., 226 Atlantic Ave., Clayton, N. J.	201-203

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Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne & Windrim Aves., Philadelphia 44, Pa.	30-31
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Johnson Company, R. 30 Church St., New York 7, N. Y.	425-426	Liquid Drive Division, G. E. Nelson Company, Holly, Mich.	425-426
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Magnetroil, Inc., Division of Fred H. Schaub Engineering Company, Inc.

2110 S. Marshall Blvd., Chicago 23, Ill. 303

MANNING, MAXWELL & MOORE, INC.

250 E. Main St., Stratford, Conn. 90

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Box 617, Edgewater Branch, Cleveland 7, Ohio. 402

MASON-NELAN REGULATOR CO.

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Maury Manufacturing Co.

Chicago, Ill. 437-438

Mechanical Engineering,

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MERCOID CORPORATION, THE

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Merica Instrument Company,

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Metalлизing Company of America,

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Metzger Company,

Grand Rapids, Mich. 493-494-495

Minneapolis-Honeywell Regulator Company, Industrial Division,

Wayne & Windham Aves., Philadelphia 44, Pa. 30-31

Monroe Tube Company, Inc.

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Monte Co., J. Arthur,

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Mundet Cork Corporation,

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NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY,

525 William Penn Place, Pittsburgh 30, Pa. 15A

Nelson Company, G. E., Liquid Drive Division,

Holly, Mich. 425-426

New Hermes Engraving Machine Corp.

13-19 University Place, New York 3, N. Y. 498

New York Belting & Packing Company, Gilmer Belts,

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New York Steam Generator Sales Co.,

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Nichols Hydraulic Equipment, Inc.

298 Lafayette St., New York 12, N. Y. 573-574

Nordstrom Valve Division, Rockwell Manufacturing Company,

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Oliver Iron and Steel Corporation, Berry Division,

S. 10th & Muriel Sts., Pittsburgh 3, Pa. 433

Omega Machine Company,

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Patron Transmission Co., Inc.,

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Peck, Shaw & Wilcox Company,

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Pemborthy Injector Company,

1242 Holden Ave., Detroit 2, Mich. 309

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Pike Hoffman Control Company, Inc.,

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PITTBURGH CORNING CORPORATION,

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Plant Engineering,

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Pneu-Trol Devices, Inc.,

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Porter & Co., Incorporated, H. W.,

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Radio Corporation of America, RCA Victor Division,

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Ramsey Corporation,

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Republic Steel Corporation, Steel and Tubes Division,

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Ridge Tool Company, The,

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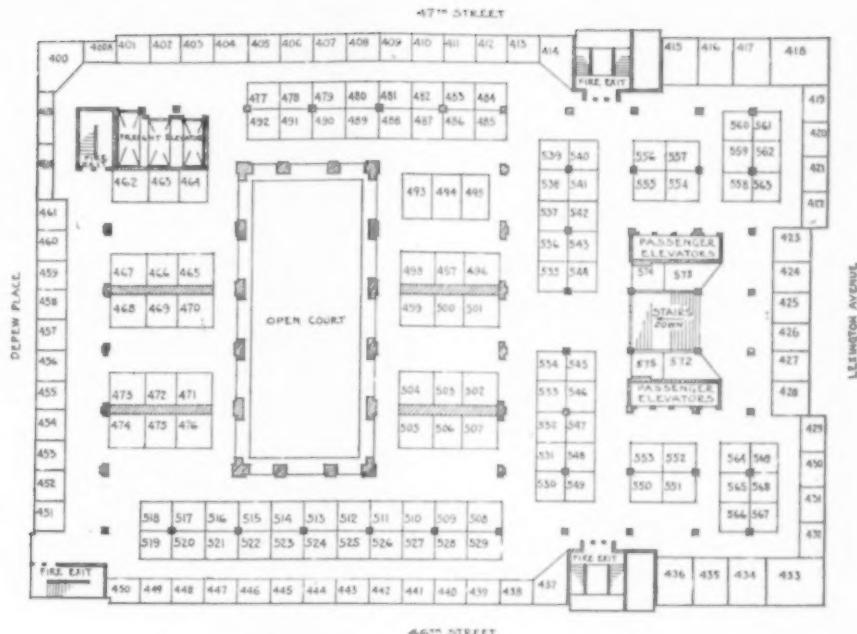
Robinson, John R.,

550 W. 31st St., New York 1, N. Y. 540

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POWER SHOW
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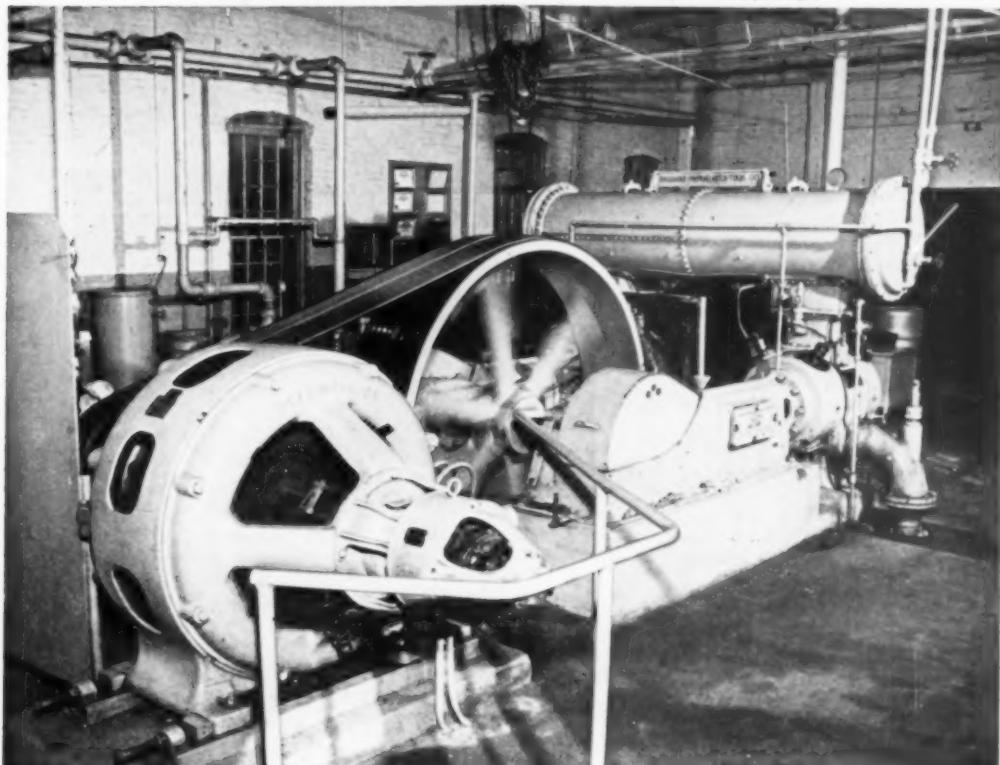
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Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.	70		
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UNITED STATES HOFFMAN MACHINERY CORPORATION, 105 4th Ave., New York 3, N. Y.	435-436		
UNITED STATES STEEL COMPANY, 525 William Penn Place, Pittsburgh 30, Pa.	15A		
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SINCLAIR RUBILENES®
for low maintenance costs

Storage Tanks for Fuel Oil Require Careful Selection and Planning

By ROBERT H. EMERICK

Consulting Mechanical Engineer
North Charleston, South Carolina

Size, type, location, and type of installation, all affect cost. Yet, finished storage must be adequate, safe and economical to maintain.

THE cost of an oil storage tank is affected both by its shape and its size. Chart No. 1 indicates the relative costs of tanks according to their form; Charts Nos. 2 and 3 point out the influence of size.

Size and Form

Our first decision in planning a storage tank concerns location. To hold piping at a minimum, we will select a site convenient to the product delivery, near the water if the oil comes in by tanker or barge, on a rail siding if we depend on tank cars. This is the ideal procedure, but if the tank is of large size, not always easy or economical to arrange. As another consideration, water fronts sometimes are swampy, and then the tank must be supported on piles which adds tremendously to the cost.

Determining the site therefore, frequently requires us to make several studies in which we balance the piping construction and pumping costs of one location, against the land charges and operating features of another. In any event, tanks for storing more than 50,000 gallons, or smaller tanks in congested neighborhoods, must be diked, and since the dike must be capable of containing the entire contents of the tank, the area occupied by a storage tank and its impounding dike is considerable, thus intensifying the land problem.

Sizing the tank, with a tentative site chosen, depends on our rate of consumption and an evaluation of our available replenishments. If deliveries are irregular or doubt-



This multisphere tank at Ft. Lauderdale, Florida, was built by Chicago Bridge and Iron Co. It holds 30,000 gallons and is 38 feet long.

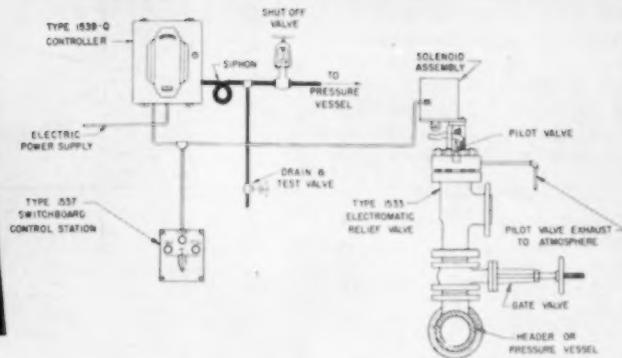
ful, then we should build all the storage we can. This is particularly true if oil is vital to our operations. Another thought concerns seasonal costs. Generally oil may be purchased a little cheaper during the non-peak seasons, and for this reason storage facilities are desirable. Probably if there is one basic rule we might well observe with the world petroleum situation in its present unrest, the rule is this: provide all the storage we can. Lean supplies may well become characteristic of the future.

Probably our thinking will be affected by the money we can afford to invest. The costs shown in Charts Nos. 1, 2, and 3 apply to the tanks only; charges for land, piping, fill and discharge racks, pumping stations and other needed items must be added. Pipe lines may be expected to approximate the unit prices in Table 1.

The form our new tanks will take, is subject to the characteristics of the product to be stored, and modified by the space we have available. For ordinary fuel storage, the cone roof tank is quite satisfactory. If we must handle highly volatile liquids such as gasoline, then the higher costs of floating roofs are soon justified.

Storage losses occur when the tank breathes under the influence of sun heat and night coolness. These losses are not of excessive size for fuel oil which is comparatively stable, but volatile products may be expected to lose annually one barrel (.42 gallons) for each foot of tank diameter, unless we chose a tank designed to prevent these losses.

Spherical shapes generally are built to withstand moderate pressures and consequently are used frequently for handling gaseous



- 1 More accurately balanced boiler operation at peak loads.
- 2 More uniform line pressure.
- 3 Power conservation.
- 4 Less maintenance of spring-loaded safety valves.
- 5 Greater protection against overheating your superheater.
- 6 Increased efficiency for your steam generating plant.

Automatic, electrically actuated, the Consolidated Electromatic Relief Valve can be set for a differential of 1% or less between opening and closing pressure; relieves pressure precisely within close limits. The valve is operated by a solenoid actuated by a pressure-sensitive element or switch. For automatic or manual service or to cut the valve out of service, just set the switch. Cyclic action is practically instantaneous. Valve operation is not affected by high superheat temperatures or other variables. Manual operation at any pressure assures positive circulation through the superheater and greater steam flows during start-up periods than the vent valves normally provide. Danger of burning superheater tubes is minimized under all conditions of service.

You can also use the Consolidated Electromatic as a superheater surge vent or to purge a superheater or header — reduce the possibility of damage to the seats of regular valves and turbine equipment.

Greater efficiency and economy is a "must" in the steam generating plant. That is why the Consolidated Electromatic Relief Valve is important to you. Get complete construction, installation and operating details. Write today for Bulletin 720.



**CONSOLIDATED
ELECTROMATIC
RELIEF VALVE**

Sizes:

2½", 4", 10", 14"

Pressures:

Up to 2500 p.s.i.

Temperatures:

Up to 1100° F.

Standard Connections:

A.S.A. flanged and welded.



CONSOLIDATED SAFETY VALVES

A product of **MANNING, MAXWELL & MOORE, INC.**, STRATFORD, CONN.
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'HANCOCK' VALVES, 'ASHCROFT' GAUGES. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND
'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

fuels. Fig. 1 shows a tank which obviously can be fitted into areas of restricted shape.

Tanks are available in many shapes and we can choose one suited to the environment, whatever that happens to be—assuming we are able to pay a premium for tailor-made installations.

Horizontal Tanks

The horizontal cylindrical design is a common one for units of comparatively small size.

Tanks of this kind may be compartmented and are internally braced. Whereas the large vertical aboveground tanks must be erected on the site, these horizontal designs often are obtainable in a piece. Sometimes tank fabricators can supply them off the shelf. Table No. 2 presents some of the standard dimensions.

Land areas for these horizontal tanks are not expanded by the need for dikes, but the National Board of Fire Underwriters has promulgated several safety rules that should be observed. First, the distance from a tank to the nearest building should be not less than $1\frac{1}{2}$ times the greatest dimension of the tank, though not greater than 175 feet. Thus a tank 40 feet long should be not less than 60 feet from either the nearest building, or the nearest property line. Second, the minimum distance between tanks should be equal to one-half ($\frac{1}{2}$) the greatest dimension of the smaller tank. Since the greatest dimension is usually the length, our forty foot long tank should not approach its neighbor closer than 20 feet. However for small tanks storing less than 18,000 gallons, a distance of only 3 feet is acceptable.

These horizontal tanks are readily served by small, low head pumps, which take the product from tank cars or tank trucks on the filling cycle, and then dispense it from the storage tanks to trucks or cars on the reverse cycle.

Underground Tanks

If we can afford to dig a large enough hole, we can store underground all the oil we wish. The safety of underground storage is

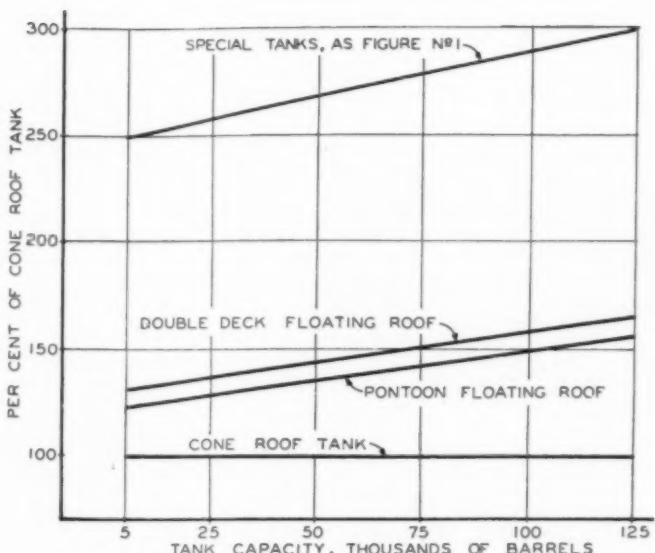


Chart 1. Effect of tank shape on cost.

testified by the following table, which shows the minimum clearance to building structures required by the National Board of Fire Underwriters.

Tank Capacity in Gallons	Distance in Feet
75,000	10
100,000	20
150,000	25
200,000	30
500,000	40
Any Quantity	50

The earthen cover on an underground tank should be two feet

thick or more. Alternatively, we may use 12 inches of earth and a concrete slab 4 inches thick. In all cases, the underground tank must be **below** any piping to which it is connected. This rule is obviously to prevent the gravity discharge of the tank at unintended times, and especially in emergencies.

On occasion we might find a semi-underground tank to be desirable, and this arrangement looks like the mound in Fig. 2. The earth should be two feet thick

Table 1—Cost of Pipe in Place

Pipe Size, Inches	Cost Per Foot In Place*	Pipe Size, Inches	Cost Per Foot In Place*
4	\$3.07	12	\$10.54
6	4.26	14	11.62
8	5.28	16	13.44
10	7.66	18	16.79

Table 2—Standard Dimensions of Horizontal Tanks

Capacity, Gallons	Length	Diameter, Inches	Number Of Supports
1,000	10'-0"	48	2
3,000	17'-6"	64	2
5,000	17'-6"	84	2
10,000	26'-7"	96	3
15,000	25'-4"	120	3
20,000	31'-0"	126	3
25,000	38'-9"	126	4

Note: Standard tanks of equal capacities but with other combinations of length and diameter are also available. For example, a 10,000 gallon tank 10'6" diameter but only 15'6" long, may be purchased if desired. Costs scale from 15¢ to 10¢ per gallon storage.

steam trap trial shows how to increase production



FREE
60-DAY TRIAL

Drive wash tubs
Steam Traps will do in your own plant. Install a trial trap. See you.

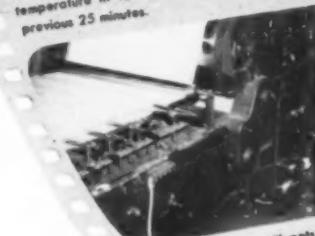
Flat-work ironers in Pennsylvania laundry heat up in 15 min. with Yarway traps instead of previous 1 1/2 hours.



West Coast Rubber molding plant cut heating cycle on presses from 15 minutes to 8 minutes by using Yarway traps.



Kettles in New England hospital kitchen reach cooking temperature in 12 minutes with Yarways instead of previous 25 minutes.



Southern textile mill gets satisfactory slasher production for first time due to faster heating-up with Yarway traps.

These 4 plants—each in a different industry—have something in common. Each installed a Yarway Impulse Steam Trap on a trial basis—and after witnessing the production-boosting results, they standardized on Yarway traps.

Experiences like these are found in hundreds of plants because Yarways are designed to get equipment hot in a hurry, and therefore into production fast.

Coupled with other Yarway Impulse Steam Trap advantages like small size, easy installation, stainless steel construction, easy maintenance and low cost—it explains why more than 800,000 Yarways have already been installed.

YARWAY

the steam trap
designed with more production
in mind

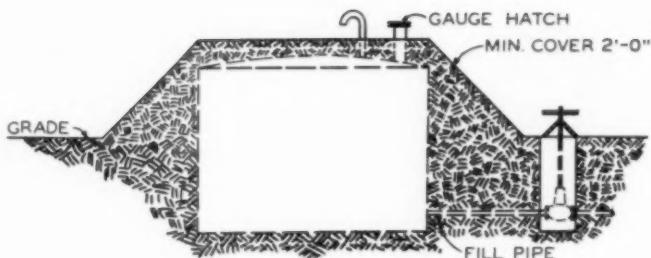
YARNALL-WARING COMPANY Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.
Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

above the steel at all points, and heaped up with side slopes of $1\frac{1}{2}$ to 1.

These semi-buried tanks have the advantage of being camouflaged from the air, and to this extent, their safety approximates that of a wholly underground installation. We consider their use where we really want underground tanks, but are deterred from our objective by a high water table or other subterranean obstruction.

Concrete Tanks

The use of concrete for both underground and above ground storage is quite common. The National Board of Fire Underwriters limits their use to liquids 35° A.P.I., or heavier.



Arrangement of a semi-underground tank

Your Responsibility as a Purchaser

A tank contract normally requires the tank fabricator to furnish all labor and material for building the tank, plus ladders,

Chart 2. Below,
Influence of size on
cost of vertical cone
roof tanks.

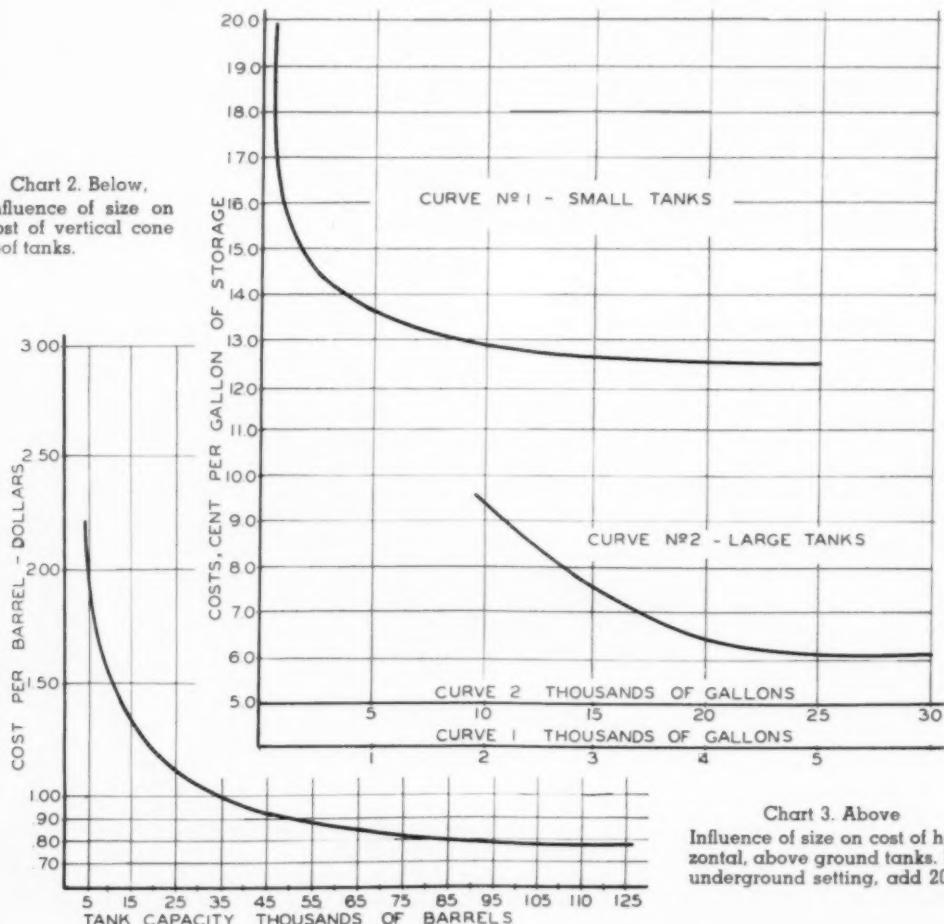


Chart 3. Above
Influence of size on cost of horizontal, above ground tanks. For underground setting, add 20%.

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- REDUCES HANDLING COSTS, DAMAGE AND LOSS

American MonoRail Engineers can show you how to get more profitable production out of your plant by systematizing material handling. Let them show you how to convert lost ceiling space to profit—how to eliminate obstructive storage around ma-

chines—lessen worker fatigue—reduce heavy load accidents—stop damage to product in motion.

Bring us your handling problems—American MonoRail can provide the equipment best suited to your needs.



SEND FOR BULLETIN C-1

A 56 page book showing how American MonoRail Engineers have successfully solved other companies' handling problems.

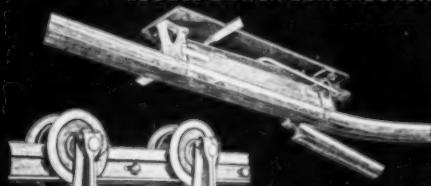


THE AMERICAN MONORAIL COMPANY

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OVERLAPPING SPLICING



TWO PIECE FORGED YOKES



SCALE HOIST CARRIER



FREE MOVING CRANES

for **BONDACTORS**, the machines
that shoot tons of concrete per hour

WINSMITH
SPEED REDUCERS®

...heart of the drive mechanism

Shooting concrete, castable refractories, acoustical plastics and similar pre-mixed aggregates, in quantities up to 3 cubic yards per hour, is the tough kind of work that this Bondactor machine is cut out for.

... and that calls for sturdiness throughout, especially the drive mechanism which bears the real brunt of running under continually heavy loads. Heart of the Bondactor's drive is a Winsmith Vertical Type, Single Reduction, Worm Gear Speed Reducer, driven by an air motor at varying speeds depending on the desired rate of feed.

Says Air Placement Equipment Co., manufacturer of Bondactor: "We started using the Winsmith Reducer about 5 years ago, and because of continual satisfaction, it has been used exclusively on all Bondactor machines."

Like Bondactor, any equipment or machines requiring speed reduction stand to gain noteworthy advantages through the selection of Winsmith Speed Reducers. Fully standardized, thereby simplifying design, installation and replacement problems, the Winsmith line is the most complete within its range of 1/100 to 85 hp and 1.1:1 to 50,000:1 reduction ratios.

Request catalog 148 for details.

WINSMITH, INC.
555 Spring St.
SPRINGVILLE (Erie County), N. Y.



manholes, pipe connection pads, gaging hatch, vapor conservation vents with flame arresters, all needed shell nozzles, and sometimes for large tanks, a circular stairway on the outside of the tank with an adequate platform at the top. In order to obtain these appurtenances however, we must specify them; they will not come to us uninvited.

The purchaser is responsible for providing the tank contractor with a suitable foundation, and the foundation better be good. The tank supplier accepts no responsibility whatever for the stability of the ground on which the tank is erected.

Weakness of the soil is made apparent by an uneven settling of the tank under load, often during the testing period when the tank is filled with water. If the weakness becomes critical, one side of the tank may be observed to start sinking into the earth, the rate of sinking being so rapid that the entire area is threatened and should be vacated immediately. The complete collapse which then follows in a matter of seconds, releases a flood of tank contents that destroys piping, dikes, everything in its path, and thus greatly expands the field of loss. This loss must be borne wholly by the purchaser.

Tank Foundation

The importance of the tank foundation is so great, that every storage tank purchaser should understand thoroughly how to build it. Here is a guide offered by a tank fabricator:

- 1—Remove all loam or organic material. In river bank areas, this includes river muck.
- 2—Replace removed material with bank run gravel.
- 3—Lay a pad of sand, at least 4 inches deep.
- 4—Design the finished grade or top of the sand, to stand 6 inches above surrounding terrain for drainage.
- 5—Provide a minimum berm of 5 feet.
- 6—Face the berm with trap rock, gravel, or asphaltic flashing.
- 7—Oil the sand with creosote, mixing with hand, a concrete mixer or a grader. Alternatively, lay

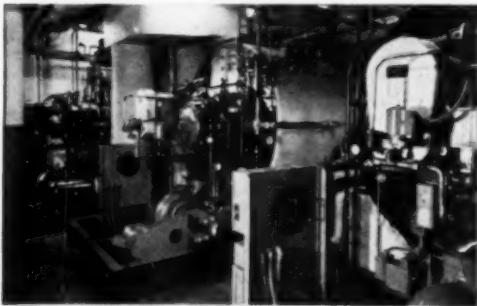


In this modern newspaper building passersby can see running presses through 11 ft. plate glass windows, located directly behind flag pole in this picture.



WASHINGTON POST BUILDING, Washington, D. C. Albert Kahn Associated Architects and Engineers, Inc. John McShain, Inc. — General Contractor. Standard Engineering Company, Engineers and Contractors.

THE WASHINGTON POST'S new 7-story building is heated by a combination of a hot blast ventilating system for the inside areas and convector radiation along the outside walls. The steam distribution system is divided into two sections, one supplying the fan blast coils at 3 lbs. to 5 lbs. pressure and one supplying the radiation at 3 lbs. to 5 lbs. pressure.



Three Cleaver-Brooks 150 hp., oil-fired, self-contained boilers were easily and quickly installed in low headroom, basement space.

Three Cleaver-Brooks 150 hp. oil-fired, self-contained boilers, installed in the basement location, supply steam for the entire heating system.

Modern Cleaver-Brooks boilers are increasingly specified for heating service. Completely self-contained and compact in design, requiring minimum headroom and floor area, Cleaver-Brooks boilers offer many installation and operating advantages — oil, gas, or combination oil and gas firing — fully automatic — clean — dependable performance — operate at a guaranteed efficiency of 80%. Available in sizes from 15 to 500 hp., 15 to 250 psi.

Write for the latest, fully illustrated Steam Boiler Catalog — Cleaver-Brooks Company, Dept. P, 304 East Keefe Avenue, Milwaukee 12, Wisconsin, U.S.A. Cable address: CLEBRO-Milwaukeeis.

Cleaver-Brooks
Originators of Self-Contained
STEAM BOILERS



Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners

a mix of asphalt road paving instead of the sand, the thickness to be at least $1\frac{1}{2}$ inches.

8—Make sure of area drainage, and provide ditches as needed.

These recommendations seem simple and sensible, but observing them is not always easy. This writer has observed the building of tank foundations which required the removal of muck and organic matter to a depth of 12 feet before sound bearing surfaces were obtained.

Tank Construction

Generally, the purchaser of a storage tank has little to do with the construction he gets, beyond stipulating that the tank must meet all requirements of the American Petroleum Institute. These requirements fix the weight of the steel plates used in each course. For example, in a tank 120'-0" diameter and say 40'-0" high, the shell plating by courses, counting up from the bottom, is as follows:

Course	Plate Thickness
1	1.11
2	0.97
3	0.83
4	0.69
5	0.55

All other factors of construction, the type of welding, riveting, bottom plating, etc., likewise are standardized by the A.P.I. Code. These are all safety items, and if we are offered a tank that fails to equal the A.P.I. standard, we don't want it.

Painting and Preserving

Most tanks are delivered to the site fully sheathed in mill scale. In this condition, not a very neat one to the eyes, they are allowed to stand and weather for at least six months. During this period the mill scale takes to falling off, helped somewhat by the alternate expansion and contraction of the metal as the sun and night chill have their turns at the tank. The scale is succeeded by a thin powder of rust which is readily wire-brushed off, and then the tank is painted with a rust inhibiting primer.

What we lay on the primer has become, in late years, a mooted

question. By tradition and proved effectiveness, aluminum paint in two coats is entirely acceptable, but recent field tests seem to indicate that a good gloss white does a better heat reflecting job than the aluminum. Reports obtained by this writer show that contents temperatures with white paint on the outside of the tank, hold from 1 to 2 degrees lower than with aluminum. This is particularly true after the aluminum has aged and become dull.

At the moment, there is a difference of opinion on the comparative lasting qualities of the two finishes. Which will prove the more economical over the full life of a tank, is yet to be determined. Meanwhile, we will take our choice on the basis of personal preference.

Painting the tank is the responsibility of the purchaser. The tank fabricator does not like to undertake it at any price, because his effort would be wasted if he applied paint over the mill scale and he does not want to wait six months for the scale to weather off.

If we object to waiting six months for a paint job, we can have the mill scale removed at the fabricating shop by pickling; or we can of course sandblast, or wire brush and wire brush and wire brush the surface until it shines. But these efforts, like the pickling procedure, cost money. Weathering is the easiest and cheapest way to get rid of the scale.

Tank Corrosion

The life of a storage tank is normally at least 20 years; but tanks set on the ground are vulnerable to corrosion close to the ground, where moisture tends to lurk.

Riveted tanks sometimes develop weeps around the rivet heads. Occasionally these leaks can be stopped with peening; more often we must clean out the corroded areas, and either redrive the rivets or weld.

The best treatment for corrosion is to watch for its appearance. The vulnerable areas of each tank should be inspected every six months, the entire tank at least once every two years. Testing with a light hammer, while effective,

must be undertaken with caution. Tank steel is always under strain when the tank is loaded and the shock of the hammer blow, transmitted through the liquid, has been known to produce hair cracks in an already overstrained plate.

If our new tank is being erected in close quarters, and we can afford the cost of concrete, a reinforced concrete dike both looks good and performs well. The reinforcing rods must be interconnected, and the National Board of Fire Underwriters requires us to provide the dike with expansion joints of non-corroding metal, each joint being fabricated of a single sheet.

The dike is to be not less than 30 inches nor more than 6 feet in height.

Earth dikes take up more room, since their slopes are usually in the ratio of 2 to 1, and we must build them with a 3 foot wide walkway on the top. Thus, for a dike 6 feet high, the ground thickness from toe to toe would be at least 27 feet. Sometimes we can steepen the slope and seed it well to hold back slides, saving a little ground area thereby.

In general, if we are storing less than 50,000 gallons, diking will not be required, although if specially hazardous conditions exist, such as dangers from floods or nearness to buildings, the inspectors may feel it necessary.

The dikes of course must be unbroken by roads, ditches, or any other opening through which a flood of oil might find escape. If drainage is difficult with rain water tending to collect within the dike, we can provide a steel pipe through the dike with a gate valve on the outlet end of the pipe. This valve must be kept closed and locked at all times except when the water is being run off. Some one individual must be given charge of the key and he alone should be authorized to open the valve, and carry the responsibility for closing it, after the drainage operation is completed.

Tank Specifications

The sure road to confusion and dissatisfaction, is to guess that tank fabricators will know what we want despite our failure to tell them. Tank contracting is a strongly competitive business, and each

Dependable Control...

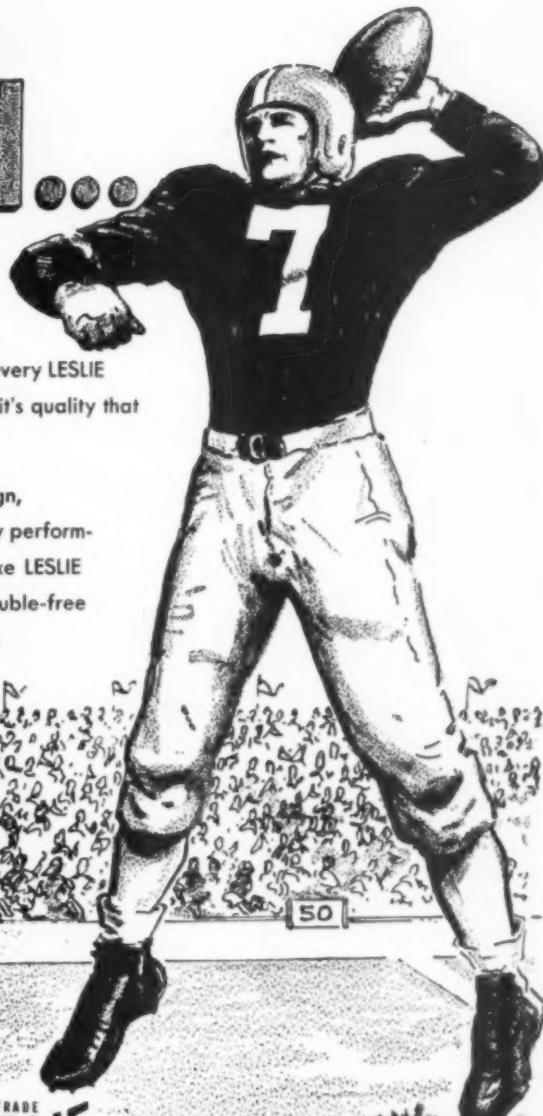
The same unerring control

that directs a pass into the waiting arms of a speeding end is a "built-in" advantage of every LESLIE Regulator. In automatic controls, as in sports, it's quality that makes the difference.

The fundamental principles of quality design, quality materials, quality manufacture, quality performance and quality service all combine to make LESLIE a logical choice for long-lasting, accurate, trouble-free pressure, temperature, or liquid level control.



Class L-3
Pressure Reducing Valve



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PRESSURE REDUCING VALVES —For Steam, Air or Gas.
PUMP GOVERNORS —For pump discharge pressures.
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TEMPERATURE REGULATORS —For process heating or cooling.
CONTROL PILOTS —For pressure, temperature, and level control.
SELF-CLEANING STRAINERS • AIR HORNS • STEAM WHISTLES

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1790

LESLIE CO. 261 Grant Avenue, Lyndhurst, New Jersey

QUALITY REGULATORS FOR OVER HALF A CENTURY

bidder may be expected to put his best price forward.

Here is a guide to items for discussion in the specification:

1—Scope of work. Number of tanks, size, location.

2—Site inspection. Each bidder should inform himself of the facilities available for storage of materials and machinery, if a railroad siding is convenient for the delivery of fabricated shapes, and if housing is to be had for his erection crew. We should tell him these things in our specification, but at the same time make him

responsible for thoroughly understanding conditions.

3—Sub-Contractors. If the tank fabricator desires to farm out some of his work to local concerns, the purchaser should approve the selections before they are made. The fabricator cannot be expected to be cognizant of local relative competence or local prejudices.

4—Preservation And Cleaning Up. The fabricator may be careless with shrubbery and cleaning up after the job is finished, unless we make him responsible before he starts.

5—Details of the Tank. This sec-

tion conveys all engineering data, enumerates the accessories and appurtenance we desire, answers the painting or pickling question, states the size of connections and connection pads we must have.

6—When We Want It. If the tank must be completed by some particular date, we should state it here.

7—Tests. If we want the fabricator to test the tank after erection, we must tell him where the water is coming from, who furnishes the pump, and who will pay for the water and electricity. If we choose to make the tests ourselves, the fabricator must be told. All these things affect the bid price.

Virginia Plant

(Starts on page 70)

air slots were placed over the front end of the grate, where ash covering at low loads would not be thick enough to protect the grate and where furnace heat and preheated forced draft might clinker the thin layer of ashes.

To provide for the most fully automatic operation and to maintain proper balance of all segments of the plant, complete Hays controls and recording and indicating instruments were placed right at the stoker front in easy view of the operators—a spot check or a record for efficient operation.

Results

After the usual starting-off troubles—synchronizing controls to swing loads, analyzing for the best stoker speeds, setting the Richardson automatic coal scale to dump the coal for even size distribution in the stoker, finding the best preheat temperature, arriving at cinder reinjection rate and other minor adjustments, and testing various sizes of coal—the plant has run continuously except for annual shut-down for cleaning and inspection, with maintenance at a satisfactory figure and as anticipated when plans and specifications were made.

There has been very little stoker and furnace trouble, no preheater replacement, and no cinder or induced draft fan outages. Steam cost, including all items of operating, power, maintenance and depreciation, is about 65¢ per thousand pounds.

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LOVEJOY
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LOVEJOY FLEXIBLE COUPLINGS
For 1, 6 to 2500 HP. Correct
angle, backlash, misalignment.
Easy to change cushions. No
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The "H" coupling . . . to 806
PM.)

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Lovejoy line meet ev-
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backlash, end play. Greater
life. All operating surfaces
ground. Diameter 5" to 4'
length 2" to 10%. Joints
001.

**LOVEJOY ELECT-O-SPEED VARIABLE
SPEED TRANSMISSIONS**
Enclosed; fractional to 5 HP.
Wide driven speed ranges up to
100% above synchronous speed.
Furnished with parts of different
currents or different materials. Give operator
choice of speed. Foot tip control while machine is
running. Valuable production time.
Variable speed wheel
or series control.

LOVEJOY VARIABLE SPEED PULLEYS
Several sizes available from fractional
to 5 HP. Provide instant speed changes.
Double pulley in single wheel
machines for changes in transmission
of heavy torque. Easily mounted on
any shaft or motor. Pulley sizes
from 1" to 12".

LOVEJOY FLEXIBLE COUPLING COMPANY
CHICAGO 44, ILLINOIS

Simplify Valve Inventories!

These "RENEWO" Valves Convert From Fullway To Plug Type!

Lunkenheimer "Renewo" Valves feature renewable and regrindable seats and discs . . . convertible from fullway to plug type. Stockroom investment and maintenance expense can be cut substantially by users who standardize on the line for all their 200-lb. bronze globe valve needs. A similar line is also available in the 300-lb. class.

"Renewo" Valves can be reground, renewed, or converted easily.



(FULLWAY TYPE) Seats and discs of hard, wear-resistant nickel alloy. Excellent for general service applications. One of the most popular valves ever designed.



FIG. 73
200 LBS. S.P.
FIG. 16
300 LBS. S.P.



(PLUG TYPE) Seats and discs of 500 Brinell Stainless Steel. Superior for severe erosive applications. Maximum resistance to effects of close throttling.



WRITE FOR Circular 577, which describes the "Renewo" line in detail. The Lunkenheimer Co., Box 360 EE, Cincinnati 14, Ohio.



BRONZE • IRON • STEEL

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THE ONE *Great* NAME IN VALVES

Instrumentation from the Maintenance Man's Viewpoint

While instrumentation is designed primarily to serve the operators, maintenance men must supply attention needed to assure accuracy and dependability.

PLANT engineers, maintenance supervisors, and electrical crews are all acquainted with at least some types of instrumentation, because all of the plants in which they work require a certain degree of instrumentation to perform properly. Normally maintenance men in modern plants will encounter many different types of instruments employed for controlling operations and recording or indicating elements of the production process. These instruments are supplied by many different companies, and while the results obtained may be the same—details of the individual instruments vary greatly.

Instruments are not just dreamed up over night. Behind each instrument are many years of research and expensive experimentation. Even after an instrument has been designed for a certain job, the research isn't over. The manufacturer strives from year to year to make improvements—he must do so to meet changing requirements of industry, and to keep up with competition.

A careful study of available instruments by the instrument engineers in industrial plants will reveal improvement in later models as compared with older types.

Wide Variety

In all industry, I believe the chemical industry requires more instrumentation than any other. This is due to the great variety of operating procedures in chemical plants. Such operations call for controlling temperatures over wide ranges, maintaining speed, regulat-

ing mixes of various components, and recording results. Because liquids play such an important part in most chemical processes, control of liquid flow constitutes one of the greatest needs for instrumentation.

Our own chemical plants use several types of instruments which are partially enumerated here for illustration: Fisher & Porter flow meters; Taylor Instrument Company controllers and recorders; Foxboro recorders; Minneapolis-Honeywell regulators; and Brown Instruments Division controlling instruments, recorders, micro-switches, and pneumatic valves. In addition there are many other indicating or recording thermometers and gauges.

Factory Service

The companies that supply industry with instruments have shops at widely scattered points. These shops supply industry with periodic service, maintenance, and repairs. The personnel working from these shops are A-1 men with the technical training and practical experience needed to assure the best service.

Several of the instrument manufacturing companies have training schools for the benefit of their customers. Your own plant instrument repair men can attend these classes through arrangements made by your company and the instrument company. The school supplies you with technical training and bench work. I have attended classes at the Brown Instrument Training School in Philadelphia, and since completing their course



By B. K. HOBBS,

Chief Electrician
Tennessee Products & Chemical Corp.
Chattanooga, Tennessee

have handled all of our instrument engineering without any serious trouble.

Schedule Needed

Our repair procedure for instrument maintenance is set up on a schedule similar to our electrical maintenance work. Most instruments are delicate and require the best of care. A special lubricant is supplied for each type of instrument. Some instruments have many moving parts that wear from excessive use and must be repaired at one time or another. This requires stocking many parts.

Most instruments operating under normal conditions require overhauling about once a year. Along with periodic checks and minor repairs, it is essential to have necessary spare parts on hand for making repairs quickly after a breakdown. Instrument companies can all supply you with parts catalogs, and all the data you need is included in these books. Any technical questions that prove outside of your range of knowledge can be answered by the manufacturers if you will write them.

Instruments of most types are made up of many small parts, and the life of your instruments as well as their effectiveness depends upon the proper functioning of each of these miniature elements. Some parts become rusty and cor-

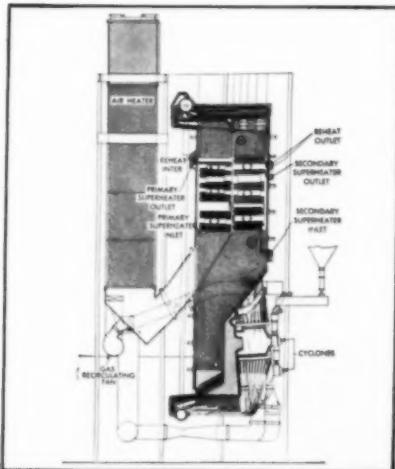
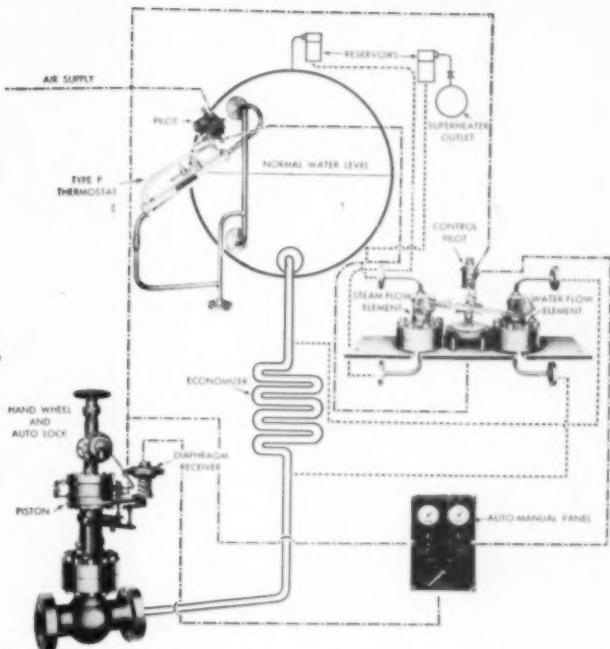
OHIO EDISON installs COPES

BALANCED FLOW
FEED CONTROL

for

cyclone-fired
pressurized-furnace,
reheat steam
generators at new

NILES
STATION



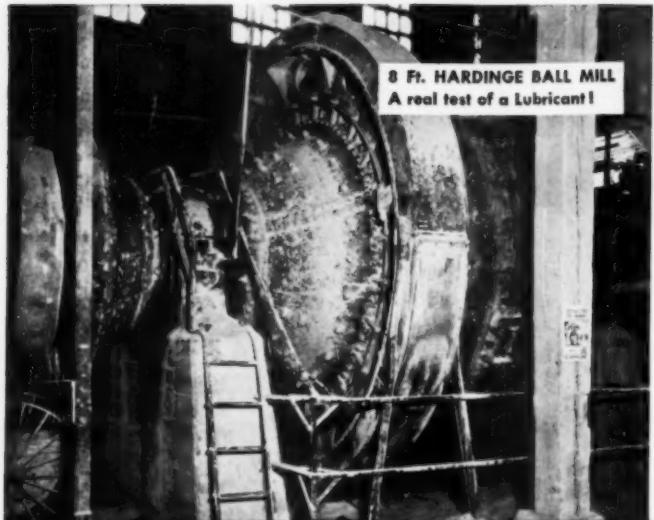
Three-influence COPES Balanced Flow Control will handle boiler feed on two 885,000-pounds-per-hour boilers at Niles Station. This modern regulator combines influences of steam flow, water flow and water level to assure stable drum level and feed in accordance with load demands.

Subject to few outages—even for routine maintenance—and easily adjusted for changed conditions while in operation, the COPES Balanced Flow is recommended for those high-duty steam generators which demand high regulator availability. The facts are yours on request.

COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE, PENNSYLVANIA



BOILER FEED WATER REGULATION



"LUBRIPLATE No. 630-AA is practically a universal lubricant"

—See writer like SPOKANE & MARYLAND
CEMENT COMPANY of Irvin, Wash.

Lubriplate Lubricants enabled us to cut the number of lubricants we were using to about half, but even then we were still using five different LUBRIPLATE Products. With the introduction of LUBRIPLATE No. 630-AA, we were able to reduce our requirements still further. Today we are satisfying all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a Universal Lubricant. Furthermore, LUBRIPLATE No. 630-AA has effected a marked savings in lubricants and labor."

Frank D. Neill
General Superintendent



Lubriplate Lubricants set new high standards: They reduce friction, wear and power consumption. They prevent rust and corrosion of bearings, parts and product. They last longer than ordinary lubricants. LUBRIPLATE

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LUBRIPLATE

THE MODERN LUBRICANT



Lubricants are available from the lightest fluids to the heaviest density greases to meet all conditions, usual and unusual. Write for case histories of the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

roded as a result of atmospheric conditions. Insufficient oiling and maintenance can contribute to the damage. Obviously, instruments require constant maintenance if they are to function correctly. We have succeeded in holding corrosion to a minimum by installing air lines in our instrument boxes. This constant, low air pressure keeps out most corrosive fumes and vapors.

Work Space

A small section of your electrical shop set aside for instrument repairs is usually sufficient for small plant instrumentation. Your spare parts, of which you should have a sufficient supply on hand to handle any emergency, may be stored in the regular store room, or in a parts cabinet located in the shop.

I think you will find it to your advantage to make a record of your instrument repairs. By keeping such a record you can get a general idea of when, and to what extent the instruments need a general overhaul. This works successfully for us, and I can't see how a well planned program of this type could fail to pay off for any industry—even a small one.

Cooperation Necessary

I do not mean to imply by the above that instrument service supplied by factories is non-essential. Their service men normally are well trained, skillful, and efficient. Also the plant man can learn a great deal by working with them. The fact remains, however, that calling the service men too frequently costs unnecessary money. And most important of all, time is lost while you wait for a factory man to get to your plant.

Since I attended instrument training school two years ago, and have been studying instrumentation in my spare time, our division of the company has had relatively little need to employ factory service on instruments. I have passed on to my crew a lot of things that I have learned on instrument maintenance, and we have been able to save our company a lot of money

(Continued on page 122)

FARRELL-CHEEK

RADIAL

WHEELS

EXTRA
SERVICE
SPECIAL
EQUIPMENT



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FARRELL-CHEEK STEEL CO.

MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

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Sprockets, Traction Wheels,

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"True Tooth" Gears and

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SPECIALIZED CASTINGS

Light Section Castings.

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Feed Screen, Furnace Tools,

Hinged Pipe, etc.

HEAVY HARDWARE

Wire Rope Fittings, Choker

Hooks, Bar Binders, Cutters

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION
PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

• • • SANDUSKY, OHIO U.S.A.



AUTOMATIC POWER PLANT

Pays Off in Talladega, Alabama, Yarn Mill



Typifying the trend toward fully automatic generating stations, this installation features Cleaver-Brooks, Clarge, Swartwout and Taylor equipment.

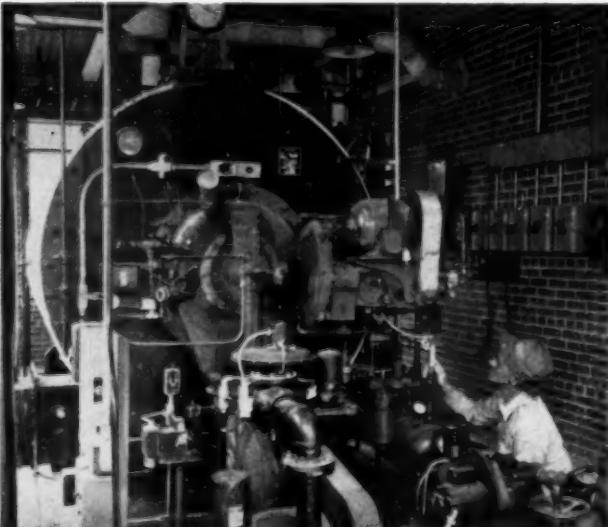
CUTS FUEL AND LABOR COSTS

reports Wehadkee Yarn Mills

PRIOR to January, 1951, Chinabee Dye Division, Wehadkee Yarn Mills, Talladega, Ala., generated steam by using two coal-fired

boilers rated at 100 hp each. One man was required to fire the boilers on each shift (3 shifts in 24 hours), and labor costs were approximately

10,000 gal capacity water tank (left) is installed on the top of the mezzanine tower over the boiler room. Note the plant engineering personnel inspecting the Swartwout air mover, which exhausts hot air from the boiler room. The new Cleaver-Brooks 150 hp automatic steam generating plant at the right, is equipped to operate on either gas or oil.





***"Every dollar
--double duty . . ."***

HARVEY S. FIRESTONE, JR.

Chairman, The Firestone Tire and Rubber Company

"Every dollar invested in U.S. Defense Bonds does double duty. Through the Payroll Savings Plan we help in the building of national defense and, at the same time, provide for personal security in the years to come. The Firestone organization is proud that more than 29,000 of our employees are participating in the Payroll Savings Plan."

Do America's wage earners appreciate that double duty feature of Defense Bonds? Let's take a quick look at a few figures:

- 7,500,000 employed men and women are investing one hundred and fifty million dollars per month in Defense Bonds through the Payroll Savings Plan.
- The number of Payroll Savers is going up steadily.
- In the first six months of this year, sales of Series E \$25 and \$50 Bonds—the payroll savers' sizes—totaled 33,946,000 pieces—an increase of 22% over the corresponding period of 1951.
- Sales of E Bonds in January-June, 1952 totaled \$1.715 million—5% more than in the same period of 1951. (The Payroll Savings Plan is the backbone of E Bond sales.)
- Today Americans hold a cash value of more than \$49 billion in Savings Bonds. Their holdings of E Bonds

—the Series bought by Payroll Savers—are now \$35 billion—\$5 billion greater than at the end of the war.

What are you doing to help your employees build for national defense and personal security?

If you have a Payroll Savings Plan, and participation is less than 50%, conduct a person-to-person canvass of employees of your plants and offices. Make sure that a Payroll Application Blank is placed in the hands of every employee. He or she will do the rest. Participation in your Plan will jump to 60%, 70%—even higher, as it has in hundreds and hundreds of plants that have conducted similar canvasses.

If you do not have the Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will help you to install the Plan—or to conduct a person-to-person canvass.

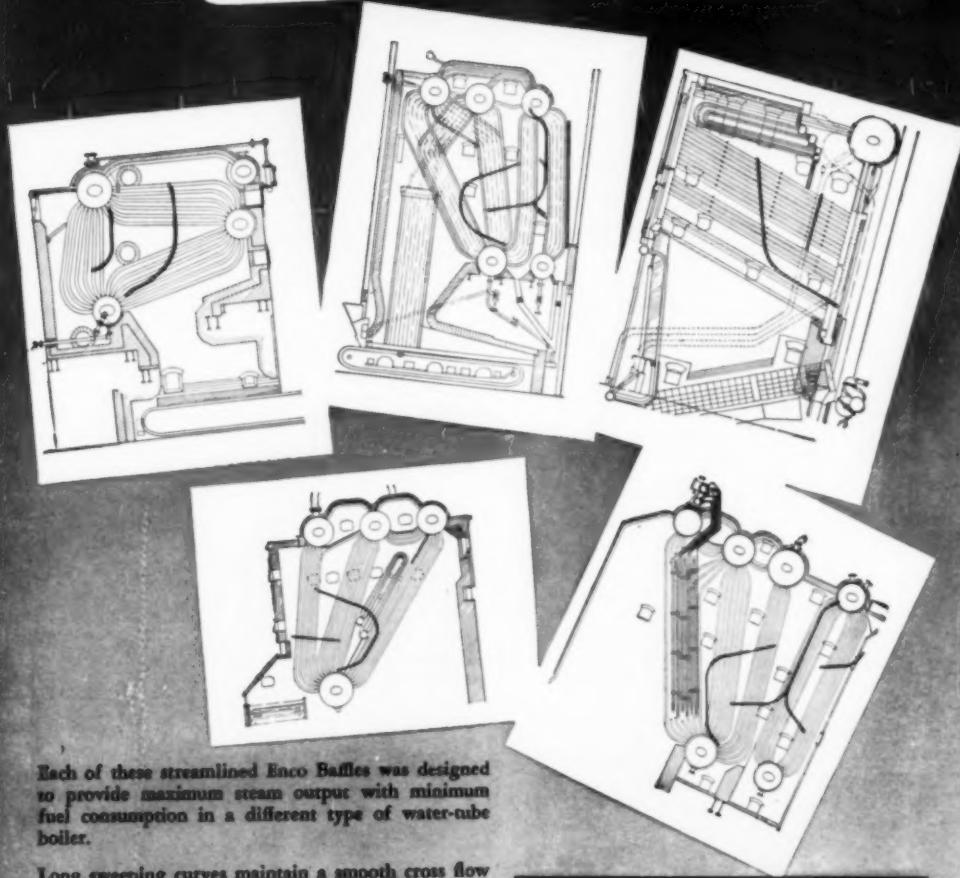
The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

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Each of these streamlined Enco Baffles was designed to provide maximum steam output with minimum fuel consumption in a different type of water-tube boiler.

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Enco Streamline Baffles are individually designed and engineered to the exact requirements of your boiler. Experienced Enco-trained crews take charge of the installation.

The 18-page Enco Bulletin, BW44, shows how engineers throughout industry have gotten higher boiler efficiency and increased steam production through the use of Enco Streamline Baffles. Why not write for your FREE copy today?

The Engineer Company Produces:

ENCO OIL BURNERS

**ENCO FUEL OIL PUMPING
AND HEATING UNITS**

**ENCO AUTOMATIC OIL-ELECTRIC
IGNITION SYSTEM**

**ENCO AUTOMATIC COMBUSTION
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0-478

\$120 per 5-day week to keep them fired. Fuel costs for coal amounted to approximately \$600 per month. No automatic stoker equipment was used, and only one boiler was fired to supply steam for the dye plant.

In September, 1950, work was started on a new building to house a boiler plant to be used for process steam and heat. Upon completion of the concrete and brick structure, a new Cleaver-Brooks Model BR 401X-15 automatic steam generating plant, equipped to operate on either gas or oil, was installed. The 150 hp boiler was designed to operate at 150 lb pressure. Equipment on the boiler includes: a Clarcage blower assembly, with damper control motor and switch; a control panel assembly, completely wired; a 1½ kva 550/220-volt transformer; and a Cleaver-Brooks flame detector. The boiler is presently operated at about 100 lb pressure.

Savings

The new steam generating equipment was placed in operation in January, 1951, and since that time fuel savings alone have averaged approximately one half of former cost per month. A full-time fireman is not needed for the new automatic boiler; therefore labor costs have been reduced \$120 per week.

A Swartwout air mover was in-

EDITORS NOTE: Major improvements in power equipment to be seen at the 20th National Exposition of Power and Mechanical Engineering, to be held in Grand Central Palace, New York, next December 1 to 6th, will reflect a marked trend toward the fully automatic generating station, according to exposition management personnel.

Feedback coupled combination controls for the entire equipment of this central station or industrial power plant have been in use for several years as auxiliaries for existing units, but the multiplication of new equipment in this line, and its rapid assimilation by engineers have led to a new line of thinking, in which future plants are being planned from the beginning as completely integrated units. Many new exhibits at the Power Show will disclose innovations designed to fit advanced concepts of the unified power plant.

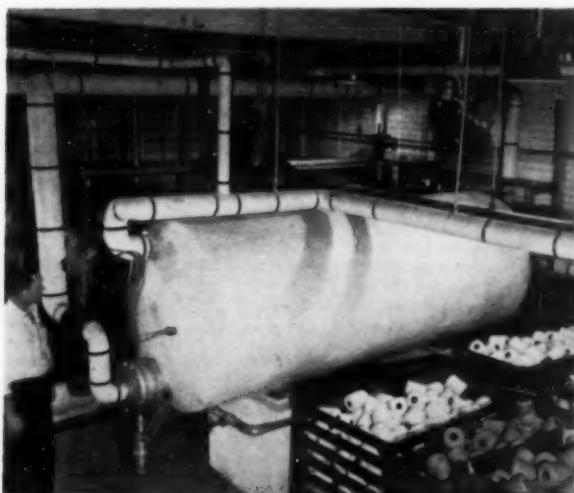


This Taylor pressure recorder is located on the mezzanine floor in the dye house. The instrument keeps a record of boiler pressure and indicates to dye plant personnel how the boiler is operating at all times.

stalled on the roof of the boiler house to exhaust hot air accumulating in the boiler room. A Swartwout deaerating type feed water heater was installed in a mezzanine chamber in the boiler house. This unit is heated by steam from the boiler, and a condensate return to feed water heater is provided. A 10,000-gallon water storage tank is mounted on top of the mezzanine tower.

The new boiler takes care of two 600-lb capacity package dye machines and serves two 6-panel hot-air yarn dryers. The boiler also heats water for a 1000-gallon hot water storage tank. The temperature of this water is kept at 160 F. Natural gas is used for fuel, and it is rated at 1000 btu/cu ft. Specific gravity of the gas is .6. The boiler is checked by dye plant personnel once every hour.

Hot water storage tank on ground-level floor has 1000 gal capacity. Water for this tank (left) is heated by the new boiler. At the right, Superintendent checks valves on Swartwout deaerating type feedwater heater located in mezzanine of boiler tower. Note insulation.





HELPING the MAN-IN-THE-PLANT

ideas . . . tools . . . methods . . . devices

KEEP POSTED—Operating Aids For Your Reference File

How About Off-The-Ground Maintenance Costs?—Painting and cleaning, electrical work and equipment maintenance, plant repairs and special jobs are discussed in Bulletin G-205 of the Patent Scaffolding Co., Inc. Recommendations are given to plant maintenance men in choosing and applying the most efficient supporting equipment for the job at hand. For your free copy circle item number B-10 on the page 17 reader service coupon post card.

Bearings Running Hot?—Choice of oil or grease, and everyday problems of ball bearing lubrication and main-

nance are discussed in "The Lubrication of Fafnir Ball Bearings" available to you by circling item number B-11 on the page 17 post card.

Too Much Maintenance Paperwork?—Check on Remington Rand's simplified preventive maintenance control for plant and production equipment. Folder KD-705 shows how Kardex provides close control necessary by signaling servicing dates for every piece of machinery in the plant, listing work to be performed and recording dates of accomplishment. For your free copy circle item number B-12 on the page 17 reader service post card.

Conveyor Belt Failures?—Ply separation, carcass deterioration, irregular plies, edge wear, and longitudinal seam failure are some of the items covered in Barber-Greene Company's 8-page Conveyor Belting Bulletin. Belt selection tips are also given. For your copy circle item number B-13 on page 17.

Want to Make Your Lumber Mill More Productive?—Electrification of all processing operations is described in a new 50-page book available from Westinghouse. Twenty-one phases of the application of electric power in the lumber industry are noted. Sawmill drive application chart is included. For a complimentary copy of the book, B-5299, circle item number B-14 on your reader service post card—page 17.

How to Reduce Stack Dust

Report shows operators of small stationary plants how to reduce cinder and fly ash in stack gases.

MOST COAL-FIRED PLANTS are designed and operated so the quantity of dust in the stack gases is below permissible limits of municipal ordinances. There are plants, however, where dust from the stack should be reduced to comply with regulations and to improve public relations.

"How to Reduce Stack Dust From Small Stationary Plants" is the second in a series of booklets prepared by Bituminous Coal Research, Inc., to help coal users get maximum satisfaction from coal. This industry aid combines the latest research informa-

tion with the experience and judgment of men active in the field.

Particular attention is given to the smaller plants up to approximately 300 boiler hp, because thorough study of their problems is not always economically feasible for manufacturers of dust collectors. Factors influencing the quantity of solids in stack gases are reviewed and suggestions that will aid in lower cinder and fly ash emission are discussed.

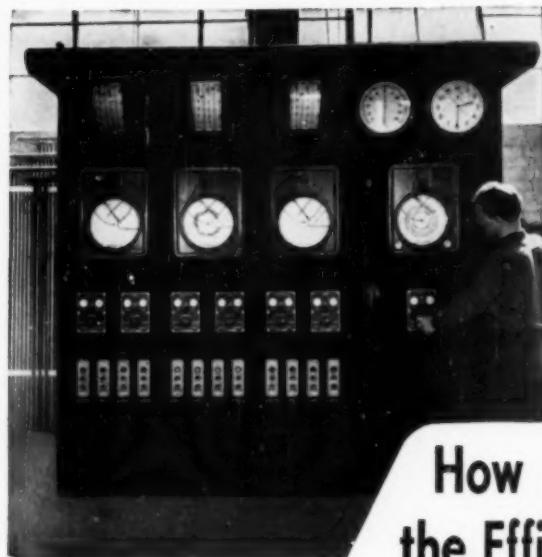
For the smaller plants where investment in commercial makes of dust collectors is rather difficult to justify, there are shown typical designs of

traps that have been beneficial in reducing the quantity of coarse solids in stack gases. The bulletin emphasizes, however, that before employing one of the designs of simple traps illustrated, efforts should be made to have the particular problem studied by the local air pollution control office and one or more manufacturers of cinder and fly ash collectors.

The 12-page, two-color report covers factors influencing emission of dust in stack gases, quantity and size of dust, representative simple cinder traps, and stack performance.

Southern and Southwestern industrial and power plant personnel can obtain "How to Reduce Stack Dust From Small Stationary Plants" for 40 cents a copy by writing Bituminous Coal Research, Inc., 2509 First National Bank Building, Pittsburgh 22, Penna.

Representative manufacturers of cinder traps and dust collectors noted in the bulletin are: Aerodyne Development Corporation, American Blower Corporation, Breslow Separator Co., Buban Dust Systems, Buell Engineering Co., Fly Ash Arrestor Co., Green Fuel Economizer Co., Prot-Daniel Corp., Thermix Corporation, and Western Precipitation Corp.



These Bailey Boiler Controls at the Chicago Pneumatic Tool Company's new plant in Utica, N. Y. insure efficient operation of three 25,000 lb per hour, 100 psi, spreader stoker-fired boilers.

How to INCREASE the Efficiency of YOUR BOILER-ROOM DOLLAR

Before you get steam you've got to spend dollars—so dollars are a form of energy.

And if your boiler-room dollars are invested in equipment that isn't working efficiently, economically, your "investment" is poor.

That's where co-ordinated controls by Bailey can help. Here's why they'll increase your "boiler-room investment efficiency":

1. Complete Range of Equipment—fully co-ordinated.

You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer complete boiler control systems.

2. Engineering Service—backed by experience.

No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. Direct Sales-Service — conveniently located near you.

Bailey Meter Company's sales-service engineers are located in more

industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

For better "boiler-room investment" efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

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Controls for Steam Plants
COMBUSTION FEED WATER
TEMPERATURE PRESSURE
LIQUID LEVEL FEED PUMPS

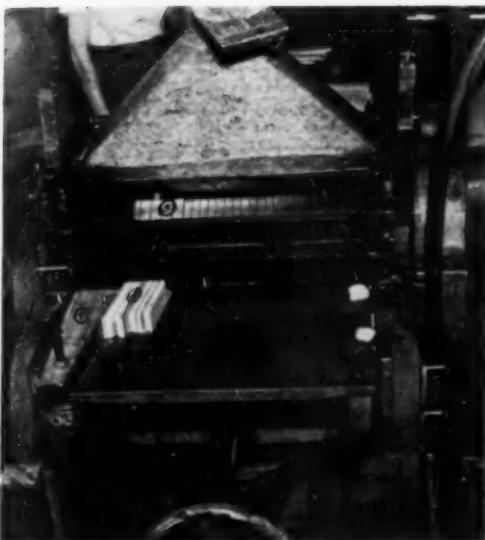
Edge Planing Operation Improved

ONE OF SEVERAL recent production improvements at the Poinsett Lumber and Manufacturing Company involved a very slow and tedious box planing operation.

The old method consisted of the so-called "box planing" where thin cabinetware parts were stacked on edge in a suitable box and passed through the planer.

Under the improved method, a false fence is placed obliquely through the planer and attached to the planer bed. When the operator places the parts on the planer bed, the feed rolls hold them tightly against the false fence in an upright position.

This production improvement has eliminated a very slow and tedious box planing operation and has decreased production costs on the operation at least 50 per cent.—*A. H. Bays, Works Engineer, Poinsett Lumber and Manufacturing Company, Trumann, Arkansas.*



Feeding end of the planer — (1) false fence placed obliquely through the planer. (2) parts to be planed on edge. (3) planer feed rolls.

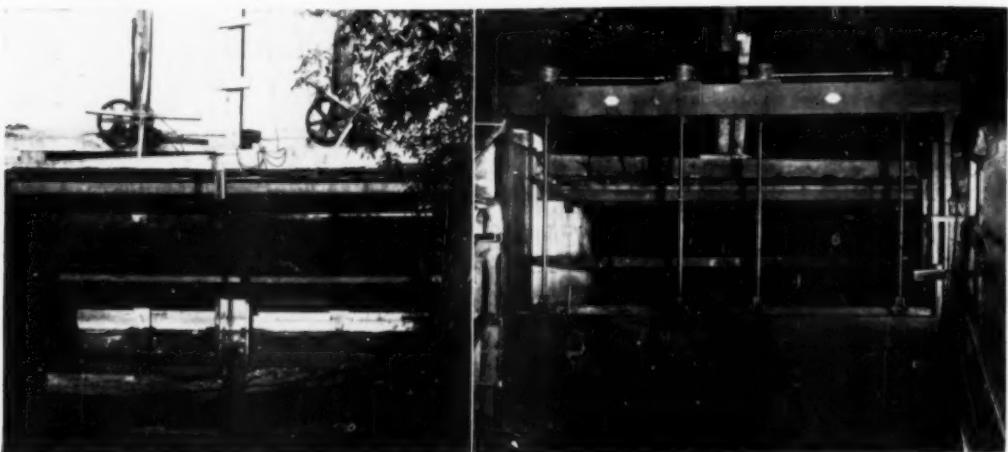
Sluice Gate Installed in 17 Hours

A PAPERBOARD mill had the problem of removing and replacing old wood gates with a pair of self-contained steel gates within a 24-hour shutdown period in the

mill water system. The new design by Rodney Hunt Machine Co. met this problem. Gates were fabricated in sections with anchors attached, and prepared components

were match marked for field assembly. One group of workers ripped out the old material while the other assembled the new gates. The latter were then swung into place, meeting close tolerances, and cement was poured around the frame—all in one 17½ hour period, from 12 noon until 2:30 a.m.—without interrupting plant production.

The 22 ft wide by 12 ft high self-contained steel gates, designed by the Rodney Hunt Machine Co., replaced the antiquated wood gate installation at the left in just 17½ hours. New gates operate by two stems in a unit frame.



A Dependable water supply

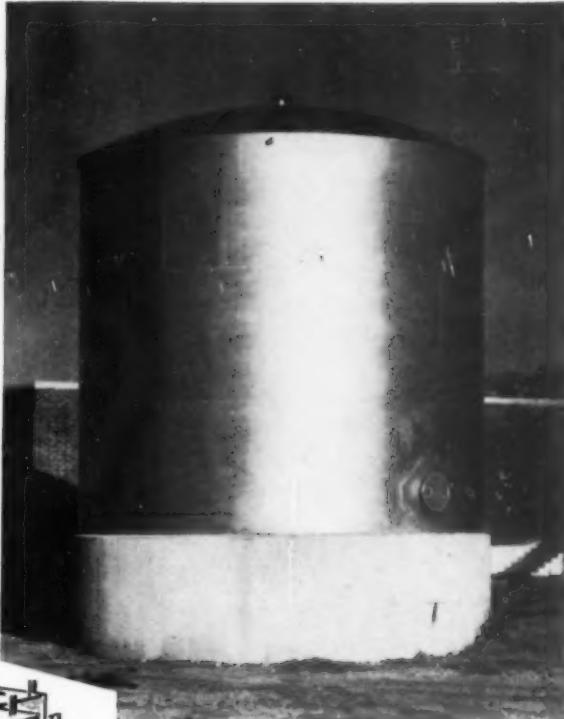
... THE FIRST
RULE IN PLANNING
PLANT FIRE PROTECTION



The most elaborate fire protection system is useless without water. Therefore, rule No. 1 in planning a fire protection system for your mill or plant is an adequate, dependable water supply . . . a reliable source that is on the job, ready for emergencies seven days a week.

The Belton Hosiery Company installed a 100,000-gallon Horton suction tank to supply water for the sprinkler system at its Kayser plant at Belton, South Carolina. Water is held in this tank at all times ready for use any hour of the day or night.

An adequate reserve water supply often pays for itself in a few short years. Better insurance ratings with lower premiums quickly repay the cost of the tank and are substantial savings thereafter.



Above: 100,000-gallon Horton suction tank 27 ft. diam. by 24 ft. built for the Belton Hosiery Company at its Kayser plant in Belton, S. C.

When planning your plant fire protection system, carefully consider your water supply. Write to our nearest office for further information or quotations on elevated tanks and suction tanks. We will be happy to supply complete information without obligation.

Horton Tanks and Steel Plate Work

Elevated tanks	Tunnel Forms
Flat-bottom tanks	Hortonspheres
Pressure tanks	Hortonspheroids
Fuel oil tanks	Digesters
Steel Smokestacks	Marx Savealls

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Birmingham 1.....1531 North Fifth St.
Boston 10.....104-120 Devonshire St.
Chicago 4.....2109 McCormick Bldg.
Cleveland 15.....2218 Gulliford Bldg.
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Detroit 26.....1534 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17.....1545 General Petroleum Bldg.
New York 6.....3312-165 Broadway Bldg.

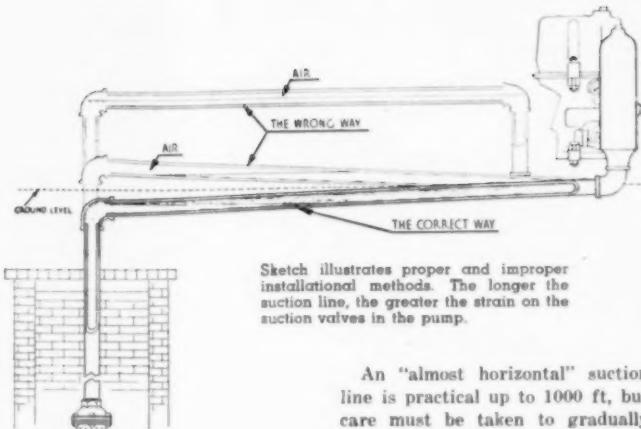
Philadelphia 3.....1646-1700 Walnut St., Bldg.
San Francisco 4.....1527-269 Bush St.
Seattle 4.....1200 First Ave.
Tulsa 3.....1625 Main St.
Washington 6, D. C.....1114 G Street Bldg.

In Canada—HORTON STEEL WORKS, LIMITED, PORT ERIE, ONT.

Suction Pump Installation

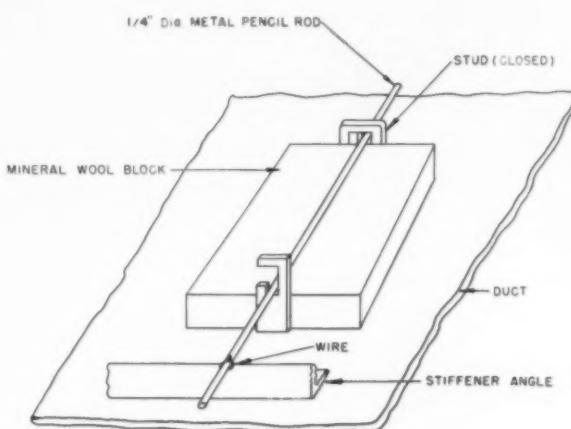
IF YOUR pump is giving trouble, it may be air bound. Usually a small amount of air is present in all water and if any point in the suction piping (from well to pump) is higher than the level of the pump, the air will separate from the water and will form a pocket in the high point of the line. It will reach such a volume that it merely compresses and expands with the pump strokes. There will then be no flow of water.

The suction line should be arranged with a gradual slope from



Sketch illustrates proper and improper installational methods. The longer the suction line, the greater the strain on the suction valves in the pump.

An "almost horizontal" suction line is practical up to 1000 ft, but care must be taken to gradually slope it from the pump to the well. On suction lines over 100 ft, use a vacuum chamber to relieve the suction valves and to guard against water hammer.—*S. W. Ford, Mississippi.*



Open rectangular studs were welded to the inside duct surface on 12 in. centers and mineral wool blocks were slid in between the studs and tightly butted together. Long metal pencil rods were inserted in the stud openings over the insulation. Studs were then closed to hold the pencil rods firmly in place against the blocks.

Stiffener angles on 24 in. centers were welded to the duct surface midway between alternate rows of studs and the pencil rods wired to them. The insulating blocks were then painted with a waterproofing material to prevent moisture absorption from the subsequent cement coat. Expanded metal lath was wired to the pencil rods as a key for a one inch thickness of refractory cement.

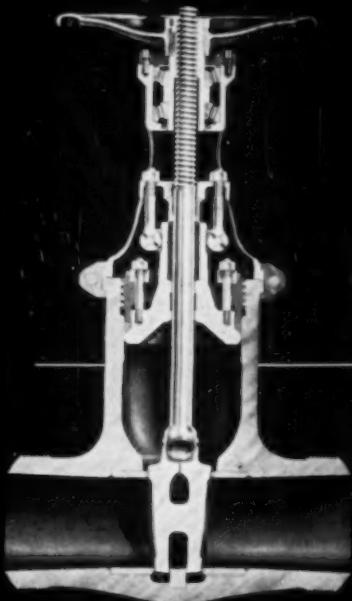
Internal Air Duct Insulation

BLOCK-TYPE mineral wool has been applied to the inside of the large secondary air ducts at a large generating station. As a result, repair time and maintenance costs have been held to a minimum; inspection of the lining once a year has been found all that is necessary.

Protected from cracks and possible damage from accidental contact by plant personnel and equipment, such internally insulated ducts have a better appearance over longer periods. The techniques devised to apply the internal duct insulation, also useful for external application, were designed to insure a long-lasting, moisture-proof lining.—*Industrial Mineral Wool Institute.*

Experience With Nylon Carrier Rope

NUMEROUS questions on the use of Nylon carrier rope have come to the mill from various sources. Before answering some of the questions, I would like to tell you why we started using Nylon ropes. We needed to increase production and, among other things, to do so we had to have more drying capacity. Being somewhat handicapped for space on the machine



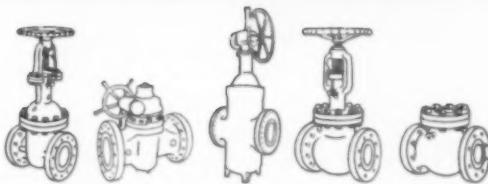
STEEL

COMPLETE LINES OF CAST STEEL VALVES AND PIPE FITTINGS are manufactured by Walworth in a variety of pressure classes, types, sizes, and patterns for general industrial use. Walworth also manufactures cast steel valves for specific service applications.

Walworth produces steel bar stock valves, and cast steel valves made of carbon steel, carbon molybdenum steel, corrosion-resistant, and heat-resistant alloy steels. Included are gate, globe, angle, check, and lubricated plug types. Sizes range from $\frac{1}{4}$ to 30 inches; pressures range up to 5,000 psi. Full information is contained in Walworth General Catalog 52, a copy of which will be forwarded if requested on business letterhead.

Walworth also manufactures complete lines of valves and fittings made of bronze, iron, and special alloys as well as steel. Walworth-made valves, fittings, and pipe wrenches total approximately 50,000 items.

Walworth engineers will be glad to help you with your problems. For full information, call your local Walworth distributor, nearest Walworth sales office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, New York.



Illustrated in section is an 8-inch Series 900, Walworth Pressure-Seal Cast Steel Gate Valve designed for high-pressure, high-temperature service. Pressure-Seal Valves are available in Series 600, 900, 1500 and 2500; sizes 1 to 16 inches. Small Cast Steel Valves, Series 1500, in angle and Y-globe types, are also available in sizes ranging from $\frac{1}{4}$ to 2 inches.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

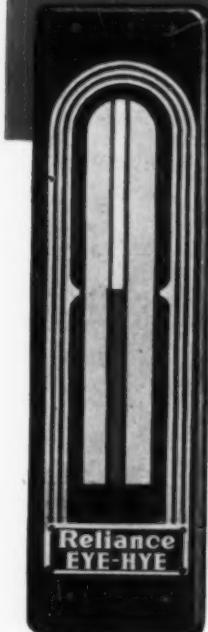
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

NOW-10,000 EYE-HYEs

"have been sold—for safer, more accurate

boiler water level supervision

The original remote reading gage



- EYE-HYE assures perfect measurement, dependability and clear reading.
- All-hydrostatic principle—no mechanical parts—no adjustments on location.
- Reads in liquid, like a conventional gage, but easier, faster because of illuminated green indicating fluid.
- One model for all pressures to 600 psi. Heavier designs for pressures to 2000 psi. Also models for wide liquid level variation—for tanks, heaters, etc. Write for Bulletin CO.

The Reliance Gauge Column Co.
5902 CARNEGIE AVE. • CLEVELAND 3, OHIO



floor, a decision was made to install 23-48 inch dryers in the basement. Operation of these dryers began in September 1947.

Certain problems accompanied this operation; and carrier rope was one of them. The machine had two carrier ropes. Each of these ropes, both of which ran from wet end to calender stacks, were over 1000 feet long.

The suggestion to divide the machine into two sections with the first section ending at No. 27 dryer was quickly acted upon. This arrangement provided some relief because the stack dryers in the basement were really eating up the ropes.

Another cause of lost time and production was the failure of the two ropes in the second section to retain the paper tail while it made a vertical climb of 25 feet or more out of the basement and then passed over the five remaining paper dryers. Here again, a suggestion solved the problem. The answer was a third or helper rope. This rope began with the last stack dryer before the vertical climb and continued over the remaining five dryers. It did a good job; but, being only 130 feet long, it underwent terrific punishment. Therefore, it required frequent splicing and replacement. The other two ropes in the section also suffered plenty and caused a lot of downtime.

Our paper mill superintendent had been considering the use of Nylon carrier rope for some time. The opportunity was at hand; he cashed in on the chance.

A $\frac{1}{2}$ in. Nylon rope was installed as a third, or helper rope. This rope ran for almost five months without requiring any splicing, and then it was cut off because the stack dryers were cut out for repairs. The second section of the dryers, shortly thereafter, was equipped with $\frac{3}{8}$ in. Nylon ropes.

An emergency situation revealed to us the high tensile strength of Nylon rope. A gear hub bolt fell into the stack dryer train and wrecked two gears causing the loss

William H. Wagner
Plant Engineer
Blue Bird Silk Mfg. Co.

Alfred J. Sidler
Plant Manager
Blue Bird Silk Mfg. Co.

"Our **Powermaster** Boilers
are dependable, efficient,
easy to service, and
economical to operate"



20% Saving in Steam Cost at York, Pa. Manufacturing Plant

William H. Wagner, Plant Engineer of the Blue Bird Silk Manufacturing Company, knows the problems of generating high-pressure steam 24 hours a day, 365 days a year. And he knows how serious it can be for a busy manufacturing plant if there is trouble or failure in the boiler room. That's why, two years ago, the company replaced their old-fashioned coal-fired boilers with two 200 h.p. POWERMASTER packaged automatic boilers, burning #6 (Bunker C) oil. Here is what they found:

- The cost of producing steam for processing and heating dropped 20%.
- The steam produced now is much drier.
- The POWERMASTERS respond very rapidly to variations in load.
- Maintenance has been negligible.

Little wonder that Alfred J. Sidler, Plant Manager, says, "If we had it to do over again, we would certainly buy POWERMASTERS."

No other packaged automatic boiler gives you all 3 advantages of the Powermaster:

1. **SAVE FUEL**—because the special Powermaster burner design gives you top efficiency when operating anywhere between 30% and 100% of capacity.
2. **SAVE IN MAINTENANCE** and clean-up time. Complete combustion of fuel gives practically smokeless and carbon-free operation. The burner has no moving parts to wear out . . . or to be cleaned daily.
3. **CHANGE FROM OIL TO GAS** (or gas to oil) in just a few minutes. Burn light oil, heavy oil, or gas—whichever is cheaper. You no longer need depend on one source of fuel supply.

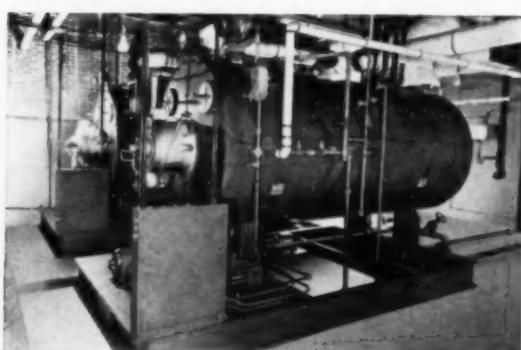
Write for this Catalog

To get complete information about this modern packaged automatic boiler for steam or hot water, write for Powermaster Bulletin 1218. We'll be glad to put a copy in the mail for you.



► These 200 h.p. POWERMASTER packaged automatic boilers have been operating round-the-clock for more than two years at the Blue Bird Silk Manufacturing Company, York, Pa. Burning #6 oil, they produce a total of 13,800 pounds of steam per hour.

Powermaster®
PACKAGED AUTOMATIC BOILERS
In sizes to 500 h.p.; pressures to 250 psi.
ORR & SEMBOWER, INC.
Established 1885
910 Morgantown Road, Reading, Pa.



helping the man-in-the-plant tools and methods (continued)

of the drive on four stack dryers. Thereupon, we ran an extra $\frac{3}{8}$ in. Nylon rope in our outside carrier rope sheaves. Then, by exerting tremendous tension on all three ropes, we were able to continue operations. These three ropes pulled four 48 in. dryers until repairs had been made to the damaged gears.

Nylon rope has about twice the breaking strain of cotton rope of equal diameter. Its wet strength is about 80 per cent of its dry strength. Here are some figures on the breaking strength of $\frac{3}{8}$ in. and $\frac{1}{2}$ in. Nylon and cotton rope: $\frac{3}{8}$ in. Nylon—2820 pounds, $\frac{3}{8}$ in. cotton—1600 pounds, $\frac{1}{2}$ in. Nylon—4950 pounds and $\frac{1}{2}$ in. cotton—2600 pounds.

The breaking strength of $\frac{3}{8}$ in. Nylon carrier rope, therefore, is only 220 pounds greater than $\frac{1}{2}$ in. cotton rope. This small increase in strength, however, coupled with greater wearing properties of Ny-

lon permits the use of smaller diameter carrier ropes. Contrariwise, the sheaves do not always lend themselves to the use of a smaller rope. Some grooves are not U-shaped. Ropes in such grooves, no matter what the size, will roll together and will grip the sheet. We would have $\frac{1}{4}$ in. rope on our machine if we had U-shaped grooves.

Any regular short splice can easily be put in a Nylon rope without fear of slippage. It is good insurance to burn the ends of the completed splice, as this tends to prevent splice failure. If the splice is not too hard, it will give a life of three to five times that of a cotton rope.

The initial cost of Nylon rope is high. Yet, our record of downtime for splicing shows such initial cost to be relatively unimportant. For example, in 1947 using all $\frac{1}{2}$ in. cotton carrier ropes, we were down 22 hours and 45 minutes for the purpose of splicing rope.

There is one place we are making money. We have almost cut out our downtime on splicing rope. No need

to tell you how much money is lost per hour while a machine is not operating.

The cost of a 5000-foot length of $\frac{3}{8}$ in. Nylon rope is about \$580.00. A 5000-foot reel of $\frac{1}{2}$ in. cotton rope (the size we used before changing to Nylon) costs \$520.00.

According to our records, $\frac{1}{2}$ in. cotton carrier rope cost us one and four-fifths cents per ton and several hours lost time to make carrier rope splices and replacements. Nylon rope, to date, has run a little over one cent per ton. Through its use, we feel that we have reduced our rope cost well over 50 per cent.

In summary: Nylon carrier rope has great tensile strength but is comparatively safe if a sufficiently small diameter rope is used. A Nylon rope can easily be spliced and run successfully. Nylon rope is expensive; but, in the majority of cases, it will out-last cotton rope at least two to one.

Abstract of paper presented before the Joint Fall Meeting of the Southern and Southeastern Divisions of The American Pulp and Paper Mill Superintendents Association, by R. W. McCormick, Asst. Paper Mill Supt., National Container Corp., Jacksonville, Fla.

Debarker Reduces Saw Mill Losses

WHILE mid-western meat packers claim they utilize every part of the pig except the squeal,

Southern lumber manufacturers are beginning to use every part of the tree—including the bark.

Lumbermen and machinery manufacturers watch the first log being run through the Andersson sawlog debarker recently installed at an Arkansas lumber mill. The new type compressed-air machinery grips the log and strips the bark.



A big step forward in helping eliminate sawmill waste and providing more pulpwood for the South's growing paper industry is a new type sawlog debarker installed this spring by a Southern Pine lumber manufacturer. Though there are several types of hydraulic and other mechanical debarkers used in other regions, this compressed-air sawlog debarker is designed particularly for economical use in Southern mills.

Alabama Made

The Andersson debarker originally was patterned by Soderhamns Machine Manufacturing Company for small logs in Sweden. Now the company has a plant in Talladega, Alabama, to build and install the debarker in U. S. lumber mills.

The debarker skins logs of their bark before they go to the mill, which means that the mill can saw off clean slabs. The slabs that are not large enough for lumber are chipped and sold to pulp mills. The bark is used for fuel.

STATE OF KANSAS

City-Owned Electric Generating Plants and Distribution Systems

50%

EXCLUSIVELY FAIRBANKS-MORSE

**50% . . . of the city-owned diesel power plants in Kansas
are exclusively powered by Fairbanks-Morse engines!**

Add all other plants where F-M engines are used and the total becomes 78%. Diesel power figures and you'll find that F-M engines are the most economical power source available.

Look again at these official diesel power figures and you'll find that F-M exclusive plants generated 45% of the KVA capacity—produced 42% of the revenue in 1951. Your state—facts establish the superiority

In Kansas—or your state—facts establish the superiority of Fairbanks-Morse diesel and dual-fuel engine performance. Their dependability, economy and low maintenance assure the best in power generation service—at a profit. Fairbanks, Morse & Co., Chicago 5, Illinois.

FROM KANSAS
GOVERNMENT JOURNAL



FAIRBANKS-MORSE

FAIRBANNS *a name worth remembering when you want the best*

DIESEL AND DUAL-FUEL ENGINES • DIESEL LOCOMOTIVES • PUMPS • SCALES
ELECTRICAL MACHINERY • FARM MACHINERY • RAIL CARS • MAGNETOS

FOSTER MEANS...

It took a flood to knock it out! After 29 years of continuous trouble-free service in the water supply system of a northern New Jersey Township, this Foster 6" Type U Pressure Regulator was temporarily put out of service by a flash flood. A new Foster Type U Regulator is now on the job, and the old valve, factory overhauled, is now ready for many more years of service.



...and **QUALITY** means

Dependable, Trouble-free Service

To give dependable regulation, a valve must be able to meet service requirements without compromise.

There is a specific type of Foster automatic valve for every service need. Each valve is engineered and built to do its job with a comfortable margin to spare, which means low maintenance.

This is the reason that Foster valves, over the years, have established a record for dependable performance second to none.

The next time you need a pressure regulator, it will pay you to tell the Foster Representative your requirements.

FOSTER ENGINEERING

SEE US AT THE POWER SHOW • NEW YORK • DECEMBER 1-6 • BOOTHS 38-39

helping the man-in-the-plant
tools and methods (continued)

Corrosion From Coal

In coal fired boilers, it is common to wash the coal dust from the floor at least once a day and sometimes once each shift. Careful investigation should be made at the bottom of any supporting H or I beams.

Coal collects on the concrete floor between the flanges of these beams. When the coal is wet from washing the floor, sulphur in the coal forms a sulphurous acid which causes active corrosion of the steel. Frequently it will be found that these steel beams are corroded and weakened so badly that they are in danger of collapse.

Take a chisel-ended hammer and tap along the web and inside of the flanges at the level of the concrete floor to investigate the condition of these beams. If they have been weakened, they may be reinforced by welding a section of $\frac{3}{8}$ in. boiler plate to the web of the beam. The plate should extend upward from the floor about one foot and from flange to flange.

Instrumentation

(Starts on page 104)

by applying ourselves to this specialized job, and serving our instruments on a regular schedule, rather than periodically as they fail.

One man cannot run the whole show. There must be someone to take his place. We have a small crew, and any one of our men may be called upon to relieve another. I have handled that problem by giving each man a chance to learn what I am able to teach him. Our men have done a wonderful job on instrumentation. Any good clear-minded maintenance man can become a dependable instrument repairman by simply learning what is needed to handle the job. He will find much literature available, and many capable men will help him if he becomes acquainted with them and lets them know he is earnestly trying to learn more about instrumentation.

Equipment & Supplies (Starts on Page 8)

have the protective alclad coating on both the inside and outside surfaces rather than on the inside only as in seamless aluminum tubes.

Weight tolerances, tube expansion, hydrostatic pressure tests, and dimension tolerances except for slight deviations in the weld area, are the same for 3S-H12 welded tubes as for seamless 3S-H14 tubes. Typical tensile strength for Alclad 3S-H12 welded tubes is 17,000 psi and yield strength 14,000 psi.

Standard lengths of the 1-in. outside diameter welded tubes are 12, 14, 16 and 20 ft, but other lengths between 10 and 24 ft may be ordered.

Design Improvements in Pneumatic Hoists

N-8 KELLER TOOL COMPANY, Grand Haven, Mich., is producing an improved line of air hoists which incorporate the following features: Safety hooks are now standard equipment for the load hook, and optional for the suspension hook; improved lubrication system; redesigned brake for smoother, more positive operation; an extra bearing has been added to the motor shaft; heavier control lever for rough usage; ring gears hardened for longer wear; pendant controls available at extra cost for handling unwieldy loads; accessories available at extra cost include chain baskets, hose trolleys, I-beam hoist trolleys, and other items.



1,000 lb capacity hoist of the Keller Tool Company weighs only 30 lb.

Little stories of big savings in LAGONDA tube cleaning

The case of the Insistent Engineer



Happened at an important middle western utility. One of the engineers kept insisting that the water treatment they were using should be supplemented by occasional mechanical tube cleaning,

which had not been used for four years. Nobody believed him, but his persistence finally won out to the effect that they consented to clean one boiler with Lagonda tube cleaners, just to see. Result, startling increased efficiency of the unit, an unexpectedly large amount of scale removed, and the scheduling of Lagonda cleaning for all the boilers not only in that plant, but in all other plants of the system. Further result, orchids for the insistent engineer.

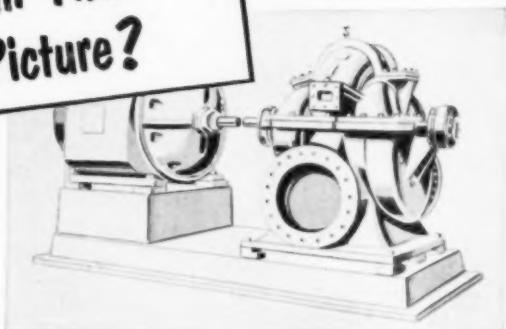
Y-2-1

GET BULLETIN Y-29
with details on all types of cutter heads and motors for cleaning all tubes, small, large, curved, straight. On request.

LAGONDA
...the oldest name in tube cleaning!

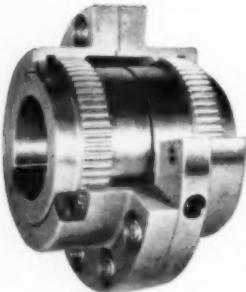
ELLIOTT COMPANY
LAGONDA DIVISION • SPRINGFIELD, OHIO
Plants at: Jeannette, Pa. • Ridgway, Pa. • Amherst, N. J. • Springfield, O. • Newark, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES

**What's Missing
In This
Picture?**



It is the one thing that will make these two pieces of equipment operate properly—a SHAFT COUPLING. Any shaft coupling will permit the motor to drive the pump. But the frequency of shutdown for repairs and the extent of damage to costly equipment depends entirely on the design, construction and quality of the coupling installed. To insure longer trouble-free operation, more and more buyers specify the

WALDRON *Improved* **GEAR TYPE** **Couplings**



Their noteworthy design and operating features naturally appeal to men who understand transmission problems and requirements. All steel construction for maximum ruggedness; one piece cover sleeves; accurately crowned gear teeth; longer lining up surface; absence of all adverse crank action on shaft and bearing—these and other features combine to eliminate the usual causes for coupling failure.

Available in all types and sizes—design easily adapted for special applications. Write today for descriptive catalog and specific engineering data.

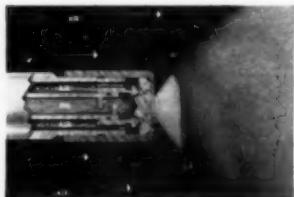
JOHN WALDRON CORPORATION
NEW BRUNSWICK, NEW JERSEY
Sales Representatives In Principal Cities

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Air-Atomizing Burner

N-9 ORR & SEMBOWER, INC., Mifflintown Road, Reading, Pa., announces that the air-atomizing "Voriflow" burner has been refined to simple yet rugged components for efficiently firing the company's Power-Master package unit boilers.



Oil flows through the central tube of the new Orr & Sembower Voriflow air-atomizing burner and through individual perforations into the atomizing air stream. Atomizing air from the annular space remaining within the outer tube is introduced into the combustion chamber across the oil streams through converging tangential slots machined accurately in the nozzle core.

Burner design is particularly critical in the multi-pass package unit automatic boiler where combustion must be accomplished in the confined chamber of an internal furnace. The improved air-atomizing burner with light through No. 6 Bunker C oils over loads of from 30 per cent to 100 per cent, is said to obtain excellent flame pattern and consistently clean combustion.

The rotary cup and pressure atomizing burners frequently used with boilers of this type are quite sensitive to viscosity changes in fuel. Atomization with heavier fuels is often incomplete, resulting in coking on the burner and refractory throat. According to the manufacturer, the drooling and carbonizing, and resultant cleaning and maintenance costs are eliminated with the new burner.

Special Floor Material

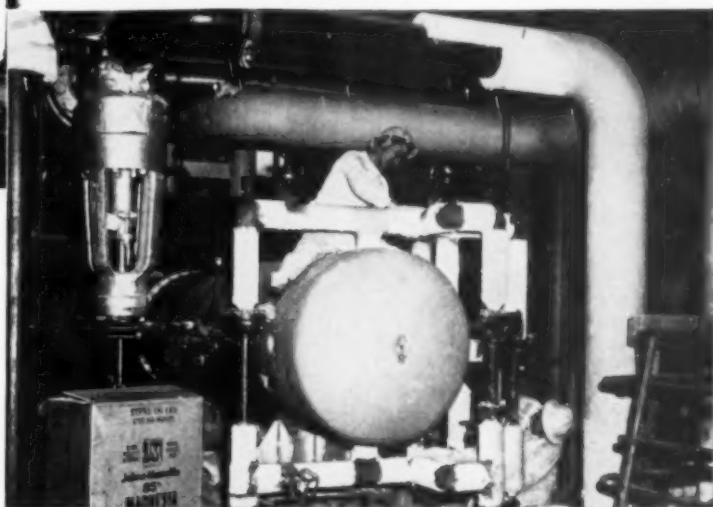
N-10 UNITED LABORATORIES, INC., 16801 Euclid Ave., Cleveland, Ohio, has developed a new flooring material known as Latex-O-crete, designed to resist the destructive action of chemicals, many acids, oils, food fats and acids, fruit juices, solvents and other items which cause deterioration of floors.

The product may be applied directly over the old surface at an average



(Top) Moss Landing, California steam plant of the Pacific Gas and Electric Company, designed by Stone and Webster Engineering Corporation, under the supervision of the P. G. and E. Engineering Dept.

At the new Moss Landing generating plant



(Right) Skilled applicators of an outstanding J-M Insulation Contractor, Western Asbestos Company of San Francisco, applying J-M 85% Magnesia to pipelines during construction of the Moss Landing plant.

P. G. and E. INSULATES WITH SUPEREX-85% MAGNESIA TO LOWER POWER PRODUCTION COSTS

When Pacific Gas and Electric Company invested \$80,000,000 in its new 771,000-horsepower electric generating giant at Moss Landing, California...the insulation, like all other materials, had to meet rigid specifications. For this important project, Johns-Manville Superex-85% Magnesia double-layer insulation was used on superheated steam pipes.

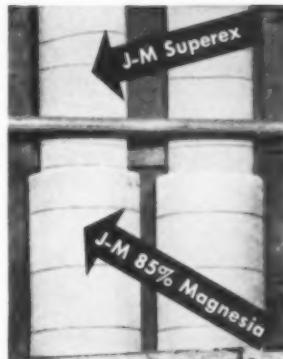
Superex Combination Insulation consists of Superex*, a J-M insulation for temperatures to 1900F, and J-M 85% Magnesia. It was installed at the Moss Landing plant for maximum thermal efficiency and long trouble-free service. This double-layer construction, proved in over a quarter-century of outstanding on-the-job performance, utilizes the higher heat resistance of Superex next to the hot surface—the greater insulation value of J-M 85% Magnesia for the outer layer. It eliminates through joints, protects the jacket against scorching and

is unharmed by expansion encountered in pipes carrying superheated steam.

J-M 85% Magnesia is the leading insulation for temperatures to 600F. It will not distort regardless of its length of service. It fits snug, stays tight. Heat savings, therefore, remain constant for the life of the equipment on which it is applied.

Whatever the insulation—it must be properly engineered and installed to pay maximum dividends. That's why Johns-Manville offers industry the services of experienced J-M Insulation Engineers and J-M Insulation Contractors. These men stand ready to combine their talents and give you an insulation job that will more than pay off your initial investment with maximum fuel savings.

For further information, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

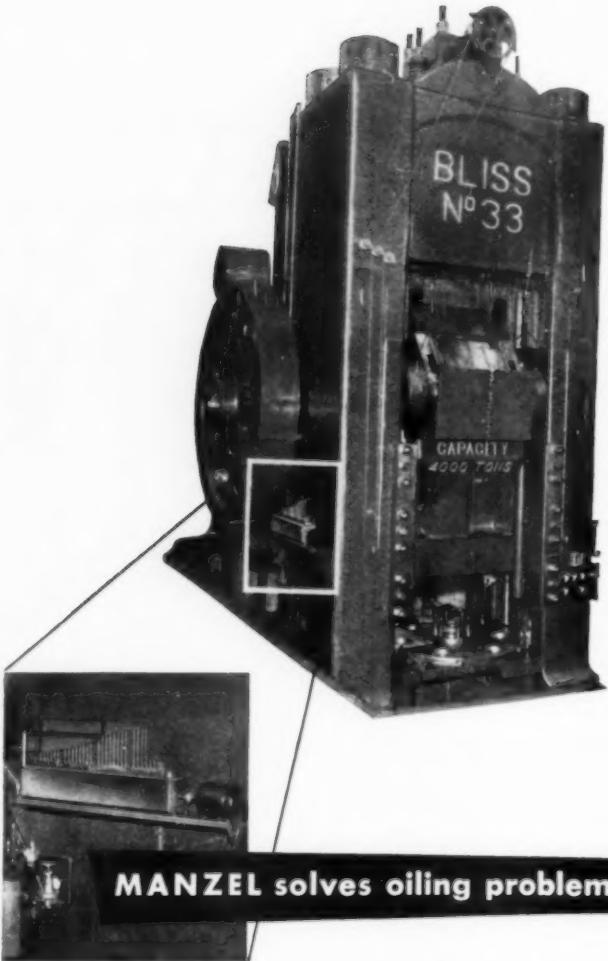


Double-Layer Superex-85% Magnesia Insulation was used on superheated piping at the P. G. and E. Moss Landing plant.

*Reg. U. S. Pat. Off.

Johns-Manville FIRST IN INSULATION

MATERIALS • ENGINEERING • APPLICATION



MANZEL solves oiling problems

*Manzel Lubricates Bliss Press.
What's your problem?*

Insure many years of economical, trouble-free service from all types of machinery with *Manzel Force Feed Lubrication*. Adaptable to numerous difficult oiling problems, "Manzel's" can be engineered to *your* requirements. Experienced representatives throughout the country.

Just write ...

Manzel

318 Babcock Street Buffalo 10, N.Y.

new equipment (continued)

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depth of only one quarter inch. No special floor preparation is necessary other than thorough cleaning.

Latex-O-crete is shipped in complete "unit" form ready for application. All ingredients are proportioned at the factory and no other materials need be added. It contains no asphalt or other bituminous substances. It will withstand considerable heavy traffic from materials handling equipment and may be applied either interior or exterior.

Variable Speed Drive

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana, has recently announced a new variable speed drive incorporating the Taper-Lock principle.

Components of the variable speed drive are: a variable pitch motor sheave; a set of wide range belts; a companion sheave; a slide motor base. The Dodge Taper-Lock principle is used in the bushings for both sheaves in the new drive, and contributes greatly to the rapidity and ease with which speed changes can be made. The drive is exceedingly compact; the sheaves occupy a minimum space on the shaft.

The pitch diameter is changed by means of a one-point adjustment. The single adjusting screw may be located at either end of the sheave although normally the sheave is factory assembled.



Cutaway view of the variable pitch sheave for the Dodge Manufacturing Corporation's new Variable Speed Drive. Sheave locks or unlocks on the motor shaft as a unit with the turn of one screw, using standard socket wrench. Pitch diameter is easily adjusted—note above.

Jenny doesn't live here any more!



YES, in the modern coal mine there's no room for Jenny. Today her job is done by powerful electric locomotives capable of pulling 50 times the load Jenny used to haul to the mine surface.

As a matter of fact, in the modern mine even the traditional pick and shovel are as out-of-place as Jenny herself! More than 90% of bituminous coal is now mechanically cut, and over 70% is mechanically loaded. Result: more economical coal to light the way, fuel the fires, power the progress of America.

But, basically, what caused Jenny to disappear? What's behind American industry's ever-more efficient machines that turn out goods at lower cost—thus making them available to more people? One word tells the story—COMPETITION.

In the coal industry there are 5,000 privately managed coal companies competing with one another and all competing in the market with other fuels. When one coal company develops more efficient mining methods, the rest can keep pace only by striving to improve even further. No won-

der that with his modern machines, developed through competition, the American miner's daily output is 4 to 24 times that of any miner in Europe or Asia—most of whom work in government-controlled coal industries.

Just as competition spurs you on to trying harder—it's competition that goads the individual company to deliver products that will outsell others. And it's competition that keeps a whole industry on its toes, cutting distribution costs, opening up new outlets, and delivering better products.

Competition—not government control—has already made America the most productive nation on earth. Competition—not regimentation—points the way to ever greater plenty for all of us.

★ ★ ★

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

SOUTHERN POWER & INDUSTRY for DECEMBER, 1952

127

IS AIR COSTING YOU MONEY?

Air cost money? You bet it does . . . hot air, stagnant air, disagreeable odors cost plenty in terms of employee efficiency and customer relationships.



TO HELP YOU SOLVE YOUR VENTILATION PROBLEMS . . .

In stores, offices and institutions, here are two authoritative catalogs. They include plans for effective fan installations, plus complete product information on dependable Emerson-Electric Exhaust Fans and Air Circulators.

Make air an asset, not a problem... write for these catalogs today! Both are yours with no obligation.

THE EMERSON ELECTRIC MFG. CO., ST. LOUIS 21, MO.

The Emerson Electric Mfg. Co.
St. Louis 21, Missouri

FREE—Without obligation, send me the Emerson-Electric Catalog(s) checked:

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FANS • MOTORS



ELECTRIC
APPLIANCES

new equipment (continued)

For more data circle item code number
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bled with the adjusting point located on the motor side. The belts have deep side walls which help to insure long life. Transverse ribs provide greater lateral rigidity. The belts are oil-proof, heat-resistant and static conducting. The slide motor base permits changes in center distances to preserve proper belt tension as the variable pitch sheave is adjusted for different speeds.

Steam-Heated Water Heater

THE COE MFG. CO., Painesville, Ohio, announces an improved model of their steam-heated water heater which is said to be even safer and more accurate in control of temperature than former models.



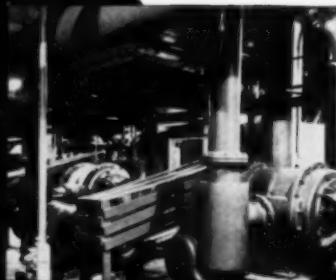
The Coe Manufacturing Company's heater is available in 17 sizes and capacities ranging from 200 to 3000 gph.

It is essentially a heater for industrial plants and institutions. A compact "package" unit, it is delivered tested and adjusted. Installation merely requires the attachment of steam and water pipes. Coordinated safety devices and regulators assure safety with maximum thermal efficiency.

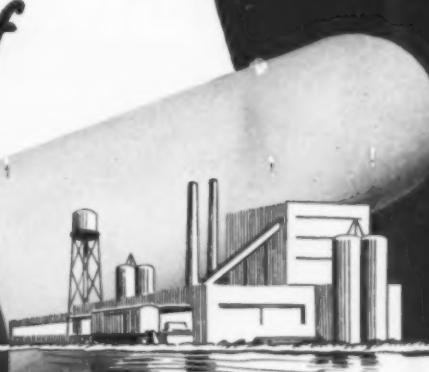
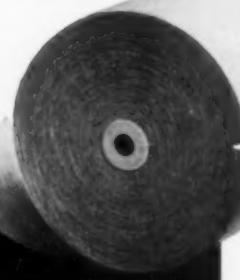
The heavy glass lined A.S.M.E. tank is insulated and protected by a metal cover.

The heater delivers water for washroom uses at the safe temperature of 120 F. And, if desired, secondary water at 160 to 180 F for scalding purposes can be drawn simultaneously directly from the tank.

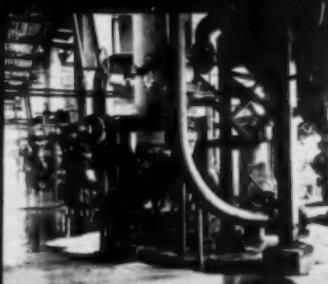
PAPER MILLS, TOO, need plenty of PIPING



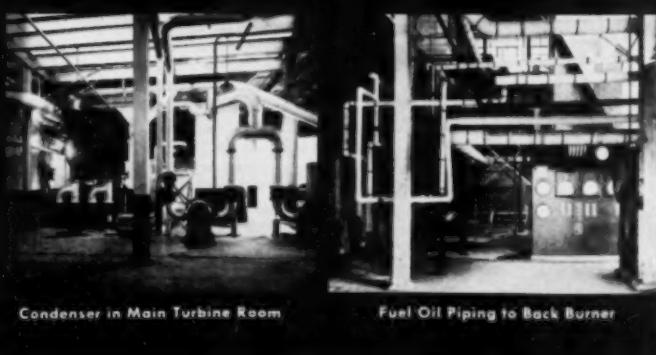
Vacuum Pumps



Drive Side of Paper Machine



Digester Room



Condenser in Main Turbine Room

Fuel Oil Piping to Back Burner

A quick trip through any paper plant will show that there's a lot of piping of all types back of every ton of paper produced. High pressure steam lines, vacuum lines and various process lines in this mill must function with complete dependability to avoid costly shutdowns . . . so the management specified Blaw-Knox piping throughout. They recalled Blaw-Knox skill and experience in fabricating piping for a great variety of industrial plants and utilities, both here and abroad. You can benefit equally on your next piping job. Say where—Blaw-Knox will be there.

Send for Catalog No. 51 which describes the complete line of Blaw-Knox Adjustable Pipe Hangers, Vibration Eliminators and Supports.

BLAW-KNOX CONSTRUCTION COMPANY

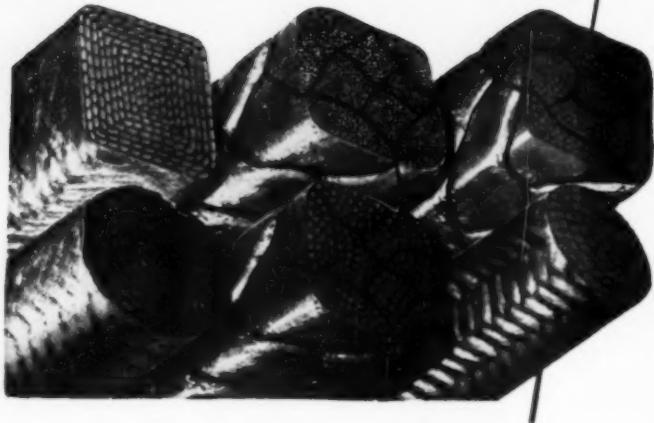
POWER PIPING AND SPRINKLER DIVISION

1525 Pennsylvania Avenue, Pittsburgh 33, Pa.

BLAW-KNOX POWER PIPING

BELMONT

THE BRAIDED
PACKING HEADQUARTERS



No one *deliberately* compromises with quality in vital braided packings. You're probably *paying* for the best, so why not make certain you're getting it—specify BELMONT, headquarters for braided packings in a wide range of types and materials.

Belmont braided packings are described and picturized in catalog No. 40. The type of braid is dependent upon the service conditions, and the materials used are asbestos, flax, cotton, jute, ramie, teflon and metals, lubricated for the purposes intended. Write on your company letterhead for details today.

Fast, *direct* help on technical problems...SERVICE through leading national distributors.

4M-2

THE BELMONT
PACKING and RUBBER CO.
Butler and Sepviva Streets
Philadelphia 37, Pa.

FOR STEAM • WATER • OIL • GAS
SULFUR • ACIDS • caustics • ammonia

THERE'S A BELMONT PACKING FOR EVERY SERVICE

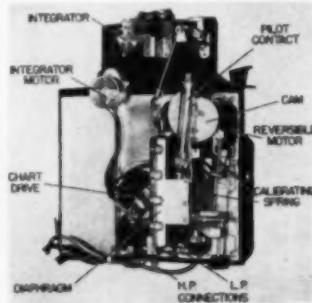
© 1952 Belmont Packing and Rubber Co., Inc.

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Low Differential Flow Meter

THE HAYS CORPORATION,
N-13 Michigan City, Ind., has introduced a newly designed low differential flow meter for measuring air flow, gas flow or recording the ratio of air flow to gas flow.



Utilizing the pilot method of operation in which no load is placed on the measuring element the diaflow meter possesses high accuracy with negligible friction. Since it uses a dry diaphragm type measuring element no water, oil, or mercury is required and leveling is eliminated. Unit construction, whereby parts can be removed separately or as a whole without affecting calibration has been used throughout. By means of a pivoted, swinging frame internal parts are accessible from the front of the case for easy removal without special tools. The unit in addition to measuring a single flow can be provided with two flow elements so that the gas and air flow records can be combined and coordinated for efficient combustion.

The measuring element is the differential type diaphragm unit which will accommodate static pressures up to ten pounds and differential pressures up to 20 in. water. A single heavy duty fine silver wiping contact converts the diaphragm differential into an electrical impulse which energizes the reversing motor to provide the power required for the meter.

The capacitor type motor which is specially built for this reversing duty has a squirrel cage rotor and a fully enclosed lubricated gear train. Normal variations in voltage and frequency have no noticeable effect on its operation. To provide ease of reading flow, a cam is incorporated to change the square-root relationship between differential pressure and flow to an easily read equal-increment flow record.



because NATIONAL TUBE
considers every plant
installation as an
individual problem...

This free service may save you plenty!

- If you are thinking of rehabilitating present equipment or planning to expand your facilities, it will pay you to get National Tube's recommendations before you select tubing.

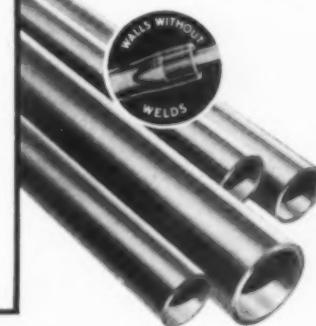
As the world's largest manufacturer of tubular steel products, we have analyzed and successfully solved thousands of tubing problems involving high pressures, corrosion, heat, and exposure.

By following the advice of our tubing specialists, many plants have been able to get much longer service out of their evaporator, condenser, heat exchanger, and other tubing applications. In some instances, our recommendations have doubled and even tripled tubing life.

Our recommendations will be based solely on the particular requirements your service involves. With National, *every installation is an individual problem and must be treated as such*. In other words, we fit the tubing to the job, not the job to the tubing!

If you want this kind of approach to your tubing problems, bring them to us. Chances are that we can save you plenty!

NATIONAL TUBE makes seamless tubing in the widest range of sizes and wall thicknesses and in a complete range of steel grades—from low carbon to the finest alloy and stainless steel. All National Seamless Tubing is pierced from solid steel of the finest quality.



NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(TUBING SPECIALTIES)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL Seamless PIPE AND TUBES

UNITED STATES STEEL

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

De-energizing Fuses

N-14 THE ELECTRIC MACHINERY
MFG. COMPANY, Minneapolis

13, Minn., has developed a new gang-operated disconnect method for de-energizing the fuses on high voltage motor control and for making them safe and convenient for handling.

The new high voltage fuse compart-

ment uses a movable panel on which current-limiting fuses are gang-mounted. The fuse panel has disconnecting blades behind it. When the fuse compartment door is opened, the fuse panel is automatically pulled to the front of the compartment, disconnecting the fuse panel from the line, and putting the fuses within easy reach. The operator can then safely and easily remove and replace the fuses without a hook stick.

Mechanical and electrical interlocks prevent the fuses being disconnected when the switch is closed, and prevent



The Electric Machinery Mfg. Company's new gang-operated disconnect method for de-energizing fuses on high voltage motor control.

EVERY STEP A SAFE STEP

WITH

BLAW-KNOX **GRATING**

Everyone walks safely, confidently on Blaw-Knox Electroforged Steel Grating . . . the one-piece panels stay rigid and strong—without shimmy or shake—because there are no parts to work loose. Twisted cross bars provide sure footing under the most adverse conditions. For complete information, write for Bulletin 2365.

BLAW-KNOX GRATING *Industry's first choice for*

- SAFETY • STRENGTH • LONG LIFE
- LOW UPKEEP • SELF-CLEANING

Grating Department
BLAW-KNOX CO., Blaw-Knox Division
2034 Farmers Bank Bldg.
Pittsburgh 22, Pa.



BLAW-KNOX ELECTROFORGED[®] **STEEL GRATING**

closing motor switch with door open. Target indicators on door tell whether motor switch is opened or closed, and whether fuse panel is connected or disconnected. Door can be locked with fuse panel in either connected or disconnected position.

Single Reduction Gearmotor

N-15 WESTINGHOUSE ELECTRIC
CORPORATION, P. O. Box

2099, Pittsburgh 30, Pa., announces

the availability of a new single-reduction gearmotor, which meets the mounting limitation requirements peculiar to side entry agitators and mixers, and is suitable for light duty coupled service applications such as fans and pumps.



Westinghouse Electric Corporation's new Lifeline single-reduction gearmotor.

The unit is available in ratings from 1 to 30 hp, 780 to 420 rpm, AGMA Classes I and II. By using reduction gears, gearmotors have the advantage of being able to deliver power at speeds comparable to slow speed motors while utilizing smaller and more efficient high speed motors.

New Developments for Mechanical Assemblies

N-16 The FRANKLIN MANUFACTURING COMPANY, 12 Center St., Westmont, N. J., has pioneered in the development of Mechanical Assemblies by use of the expanded joint.

The upper photograph illustrates an assembly where the problem was to expand a 4" O.D. mechanical tube, $\frac{3}{16}$ " thick into a $3\frac{1}{2}$ " length joint; mechanical requirement of the joint to be a minimum of 50,000 lb.

The plates into which the tube is expanded were machined .015" over diameter of the tubing. Using a negative rake tool to machine the bore, resulted in roughening of the surface to increase the strength of the joint. The tubing was annealed and inserted into the hole with no other preparation.

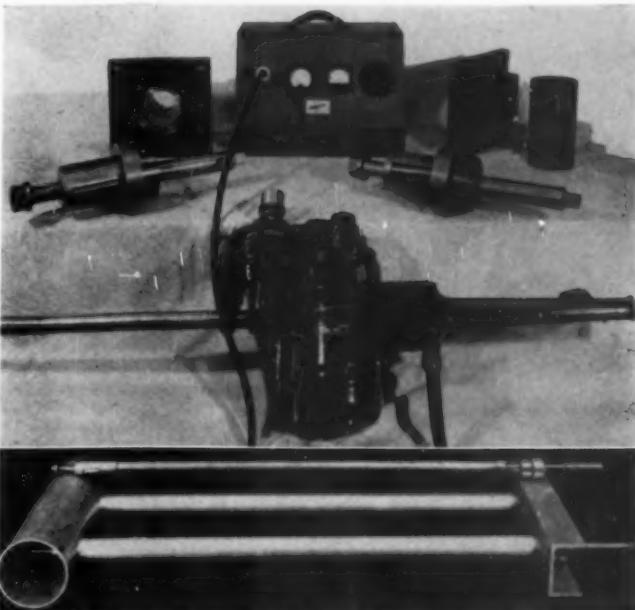
Rollers of the expander shown at right in the photograph were relieved 2" in length on the back end so that 2", only, would be expanded in the first operation. For the second operation the expander, shown at left, was inserted into the tube end. The rolls of this second expander were for parallel rolling 4" in length, thuslapping over the first expansion and smoothing out the joint.

A mechanical joint of 60,000 lb was established with an expansion of .03125 on the inside diameter of the tube, after metal to metal contact. An expansion of .015625 on the inside diameter of the tubing after metal to metal contact with the plate hole wall resulted in a mechanical joint of 30,000 lb. This development replaced the "pressed fit" application, with a much greater strength of the joint by the expanded process, and reduced cost because no precision machining on the mating parts is required.

The DUDLEY Electronic Precision Tube Expander Control operates from 115 volts, a-c 60 cycle current and will expand tubing from 2" up to 6" O.D. The drive motor weighs 125 lb. The electronic control cabinet (top center) weighs approximately 30 lb.

The lower photograph shows a development by the FRANKLIN MANUFACTURING COMPANY, for expanding aluminum hand railing. This railing consists of a 5" O.D. aluminum tube. The upright members (shown horizontal in the illustration) are $1\frac{1}{2}$ "-.3/16" wall aluminum; the aluminum channel at the bottom is $\frac{3}{4}$ " x 3". The upright aluminum tubes were expanded into the 5" O.D. hand railing and into the channel in one operation.

The photograph shows the expanding tool which was used for this development.



There are two sets of expanding rollers—one for expanding the tube into the 5 in. hand rail and another set at the opposite end for expanding the upright tubes into the channel. Both joints were expanded in one operation in about 40 seconds.

SUBOX PAINTS BEST FOR LOW COST PRESERVATION OF GALVANIZED TOWERS



A Single Coat on Weathered Structures Lasts 5 to 8 Years

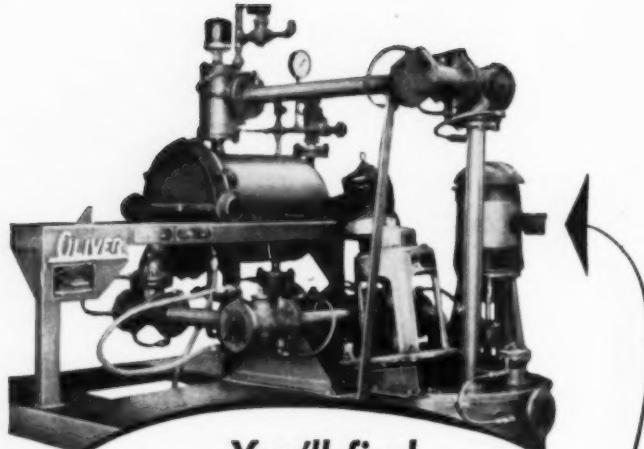
Subox and Subalex anti-corrosive paints conserve all galvanized structures better at lower cost. Painted when weathered to first sign of rust, towers receive a tough, weather-resistant armor that won't chip, crack or blister.

Subox' basic pigment is suboxide of lead — the finest anti-corrosive base. 25 years of Subox preventive-maintenance leadership attested to by industrial users throughout U. S. and Canada.

SEND FOR FREE STUDY "PAINT GALVANIZED TRANSMISSION TOWERS FOR LONG LIFE".



6 FAIRMOUNT PLANT HACKENSACK, N. J.



You'll find
DEMING SUMP PUMPS
in the most unexpected
places!

Ordinarily, you'll find Deming Sump Pumps on such jobs as sump drainage, or pumping heavy viscous or hot liquids in chemical or metallurgical work or performing many other "normal" jobs of liquid handling.

But you'll also find these versatile pumps as component units of other equipment, such as illustrated above. Here you see a standard Fig. 4610 Deming Sump Pump as a component part of the Kelly Sulphur Filter, engineered and manufactured as a standard "PACKAGED" unit by Oliver United Filters Inc.

Function of the Deming Sump Pump is pumping a mixture of filteraid and pre-clarified molten sulphur through the Kelly type pressure filter.

This operation precoats the filter leaves with a layer of clean filteraid . . . thereby aiding the clarification of the dirty sulphur during the processing and producing an easily discharged cake.

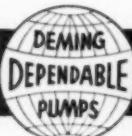
Service of the Deming Sump Pump involves a capacity up to 60 gallons per minute at discharge heads not exceeding 20 PSI at temperature from 280 to 290 F.

Somewhere in the complete line of standard Deming Sump Pumps, you, too, may discover the most efficient and economical solution to your problem of liquid handling.

Suggestion:

Send for illustrated SUMP PUMP BULLETIN 4600A.

THE DEMING COMPANY
549 Broadway • Salem, Ohio

DEMING  **PUMPS**



new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

**Fork Lift Trucks Have
Detachable Counterweights**

N-17 THE YALE & TOWNE MFG.
Co., 11,000 Roosevelt Blvd.,

Philadelphia 15, Pa., are now offering lift trucks with a new type detachable counterweight for stevedoring and other applications, where the operating weight of a fork truck may exceed ship's hoist or elevator capacity.

The cast iron counterweight, which accounts for a large part of the truck's operating weight, is held in place by guide pins and heavy steel brackets. It can be removed or attached in less than one minute using either another fork truck or a hoist.

Automatic Fastening Gun

N-18 THE HELLER STAPLER COM-
PANY of Cleveland, Ohio,

has developed a new hand-held, automatic fastening gun designed for swift, easy and economical installation of cables and hollow tube lines.

This compact machine is operated with one hand, leaving the other hand free to guide the lines being installed. Yet it is said to pack the power of a big industrial stapler. Its unusual force will drive bands around cables and tubes into hard or soft woods, plaster walls, flooring, joists and even mortar joints and cinder or mineralite building blocks.

The new fastening gun, instead of using ordinary width staples drives a special extra-size band with leg lengths varying from 3/16 to 1/2-in.



The Heller Company's fastening gun for installation of cables, hollow tube lines, etc.



98th YEARS OF EXPERIENCE IN BUILDING TANKS

FOR almost a century Cole elevated tanks have provided a dependable water supply for mills and communities. Cole quality is assured by careful, experienced designing and watchful supervision from blueprints to finished tank. Send us your inquiries for tanks from 5,000 to 2,000,000 gallons—stating capacity, height to bottom, and location.

Write for latest catalog — "Tank Talk."

Established 1854

COLE
R. D. MFG. CO.
NEWNAN, GEORGIA

ELEVATED TANKS • VESSELS • CYLINDERS
TOWERS • BINS • STANDPIPES



High grade gas, by-product, steam and household stoker coal from Wise County, Virginia, on the Interstate Railroad.



High grade gas, by-product, steam and domestic coal from Wise County, Va., on the Interstate Railroad.



High grade, high volatile steam and by-product coal from Wise County, Va., on the Interstate Railroad.



The Premium Kentucky High Splint unmatched for domestic use. Produced in Harlan County, Kentucky, on the L. & N. Railroad.



Roda and Stonega from Wise County, Va.



High grade gas, by-product, steam and domestic coal—Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna. Railroad.



High volatile domestic, steam and by-product coal from Boone and Logan Counties, W. Va., on the Chesapeake & Ohio Ry.



Genuine Pocahontas from McDowell County, W. Va., on the Norfolk & Western Railway.



High fusion coking coal for by-product, industrial stoker and pulverizer use from Wyoming Co., W. Va., on the Virginian Ry.

ANTHRACITE

Hazel Brook—Premium Lehigh
Raven Run—Premium Mahanoy
Cross Creek—First Grade Lehigh

Our engineering service, available upon application, and long and varied experience is your assurance of the Right Coal—Properly Applied.



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CINCINNATI

PITTSBURGH

NEWS for the South and Southwest

The A. J. Mueller Company Established in Atlanta, Ga.

A. J. "GUS" MUELLER, well known in the Southeastern metalworking industry, has established THE A. J. MUELLER COMPANY, Technical Sales Engineers, Box 233, Northside Station, ATLANTA, GEORGIA. The company will serve the Southeast, representing several leading manufacturers of metallurgical equipment and supplies.

For six years, A. J. Mueller was research metallurgist and field engineer for the Tocco Division, Ohio Crankshaft Company. He has also been associated with the Saginaw Steering Gear Div., General Motors Corporation, Atlanta, Georgia, and Saginaw, Michigan, in the capacity of plant metallurgist; was plant manager, Southern Associates, Inc., commercial



A. J. "Gus" Mueller recently established his manufacturers' representative business in Atlanta, Georgia, to serve a number of industrial accounts.

heat treating company of Jacksonville, Florida; general manager and vice president, National Induction

Heating Corp., Detroit, Mich.; and metallurgical project engineer with the Ford Motor Company.

THE A. J. MUELLER COMPANY will represent Newage International, Inc., portable hardness testers; Alloy Engineering and Casting Co., stainless steel and heat resistant alloy castings; Park Chemical Co., heat treating and tempering salts and oils; Holcroft and Co., production heat treating furnaces; Pennsylvania Steel Corp., special steels; D. A. Stuart Oil Co., cutting fluids and lubricants; The Tocco Div., Ohio Crankshaft Co., induction hardening and heating equipment; and Ranshoff, Inc., metal cleaning equipment. In addition, the company will offer technical assistance on metallurgical problems to purchasing agents and plant engineering personnel.



5,000 kw Gas Turbine for West Texas Utilities

A 5,000 kw simple open-cycle gas turbine has been installed in the Fort Stockton, Texas, generating station of the West Texas Utilities Company, where it will drive a 7,500 kva generator. The West Texas Utilities' photo shows the turbine being unloaded from the end of a railroad car upon its arrival from the Westinghouse Electric Corporation's South Philadelphia works.

Though only 42 ft long and 10 ft wide, the power unit is capable of producing 6,000 kw of power. Requiring a minimum of cooling water, and utilizing natural gas as a fuel, a simple open-cycle gas turbine is ideally suited to the West Texas area. Turbine will operate at 5,700 rpm, and will be connected to the 3,600 rpm generator by a single-reduction, double-helical gear. The axial flow air compressor, combustors, and the gas turbine weigh approximately 40,000 lb.

Hewitt-Robins—Houston

A new headquarters for the South Central Division of HEWITT-ROBINS INCORPORATED AT HOUSTON was opened in October.

The streamlined one-story building at 5711 Navigation Blvd., is made of reinforced concrete, contains offices for sales and engineering personnel, and warehouse space for belting, hose and conveyor equipment. L. C. HOLLOMAN is Manager of the South Central Division and JOHN W. PEW is District Manager.

Shell Oil Co., New Orleans

Two executives in SHELL OIL COMPANY'S ATLANTA office have been chosen to head a new marketing headquarters to be opened in NEW ORLEANS January 1. The two men are JAMES M. PARKS, who has been Sales Manager in Atlanta since 1941, and C. W. McDOWELL, who became a Sales Manager in Atlanta in August, 1951.

Mr. Parks will head the New Orleans office as Division Manager. He and his staff will handle the distribution of the firm's products throughout a five-state area including ALABAMA, LOUISIANA, TEXAS, MISSISSIPPI, ARKANSAS, part of TENNESSEE and part of FLORIDA.

Mr. McDowell has been made Sales Manager of the New Orleans division.

AEC Power Agreement—Ky.

The U. S. Atomic Energy Commission has announced approval of an agreement with ELECTRIC ENERGY, INC., a group of five private power companies, to supply an additional 235,000 kw of power for the operation of the AEC's uranium-235 production plant now under construction near PADUCAH, KENTUCKY. Total power requirement for the Kentucky plant is 1,940,000 kw.

The new agreement increases the total power to be supplied by Electric Energy, Inc., from 500,000 to 735,000 kw. The 235,000 kw represent 25 per cent of the additional power required by the expansion program at the gaseous diffusion plant in Kentucky. The Tennessee Valley Authority will furnish the remaining 75 per cent of the new requirement, 705,000 kw. TVA will supply a total of 1,205,000 kw.

The agreement covers a 25-year period with extensions available for the Commission. Annual costs of power when the Kentucky plant is in full operation are currently estimated at about \$23,100,000 from EEI and at about \$37,000,000 from TVA.

FUTURE EVENTS Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 33rd St., New York 18, N. Y.

Nov. 30-Dec. 5, Annual Meeting, Statler Hotel, New York, N. Y.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Charles F. Roth, Mgr., Publicity Dept., 20th National Power Show, Grand Central Palace, New York 17, N. Y.

Dec. 1-6, Twentieth National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York, N. Y.

PLANT MAINTENANCE CONFERENCE, Clapp & Poliak, Inc., 41 Madison Ave., New York 17, N. Y.

Jan. 19-22, Plant Maintenance Conference and Plant Maintenance Show, Public Auditorium, Cleveland, Ohio

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Charles F. Roth, Mgr., International Exposition Company, Grand Central Palace, New York 17, N. Y.

Jan. 26-29, 1953, 11th International Heating & Ventilating Exposition, International Amphitheatre, New York, N. Y.

NATIONAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y, 422 Kennedy Bldg., Tulsa 2, Okla.

Feb. 27, 1953, Regional Meeting, Scharbauer Hotel, Midland, Texas

April 29-May 1, 1953, 22nd Annual Convention, Rice Hotel, Houston, Texas

SOUTHERN SAFETY CONFERENCE, W. L. Groth, Exec. Dir., Box 8927, Richmond 25, Va.

Mar. 1-3, 14th Annual Southern Safety Conference & Exposition, Atlanta Biltmore, Atlanta, Ga.

AMERICAN WELDING SOCIETY, National Secretary, 33 West 39th St., New York 18, N. Y.

June 16-19, 1953, National Spring Technical Meeting with Welding and Allied Industry Exposition, Shamrock Hotel and Hall of Exhibits, Houston, Texas

ATLANTIC STEEL COMPANY

WAREHOUSE DIVISION



Now Serving the South from our new home!

OUR brand-spanking new warehouse and office building make it possible to offer customers a wider variety of products and services—plus faster shipments to any point in the Southeast.

64,400 Square Feet of Floor Space

Not all of our 64,400 square feet of warehouse space is used now to stock steel, copper and other products — including chain link fence, Quonset buildings, and playground equipment — but as these items become more readily available, we hope to keep them in stock for instant shipment.

If you would like for us to send you current stock lists as issued, drop us a line or give us a ring.

575 14th Street, N.W. EMerson 3451



"Service In Step With Southern Progress"

news for the South and Southwest (continued)



Harnischfeger Opens New Southeastern Headquarters in Birmingham, Alabama

Official opening of their large new sales office, warehouse and service station in BIRMINGHAM, ALABAMA, was celebrated October 11 by the HARNISCHFEGER CORPORATION, Milwaukee, with an open house and barbecue.

This opening also announced the consolidation in Birmingham of all territory formerly served by P&H offices in MEMPHIS, TENNESSEE, and JACKSONVILLE, FLORIDA. Harnischfeger retains sales representation in these two cities, but major functions

are centralized in the Alabama city to provide customers in Southeastern states, as well as LOUISIANA and ARKANSAS, with larger warehousing facilities and more extensive service accommodations.

Moving up from his position as Memphis district manager to take charge of the new plant and territory is RAY M. CALKINS, a veteran of 28 years of service with Harnischfeger. Mr. Calkins has been director of Memphis area activities since 1945 and

formerly served in P&H's engineering, specifications and stores departments before becoming assistant sales manager of the company's small excavator division in 1938.



Ray M. Calkins has taken charge of Harnischfeger Corporation's new Southeastern sales office and warehouse in Birmingham.

The new warehouse and service station occupy an area of 10,000 sq ft and are connected with a modern sales office of 1,500 sq ft. They are located on a four-acre site in the Broyles area of Birmingham at 1629 Vanderbilt Road.

American Welding Society to Meet in Houston, June 16-19

THE AMERICAN WELDING SOCIETY has announced its plans for conducting a National Spring Technical Meeting at the Shamrock Hotel in HOUSTON, TEXAS, June 16-19, 1953, accompanied by a four day Welding and Allied Industry Exposition in the Shamrock Hall of Exhibits, adjoining the Hotel.

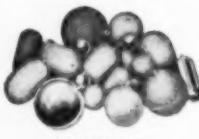
The technical paper program will include papers and symposia on welding and allied subjects of national and regional aspect and technical treatise subjects of interest to the specialized industry of the Southwest; the aircraft, the oil, chemical, shipbuilding, etc. It is expected that this comprehensive program will draw a very large attendance of top executives, engineers, metallurgists, production men, fabricators, process plant men, steel makers, ship builders and all of the welding profession.

It is pointed out that the time, June 16-19, 1953, was selected to avoid interference with other industrial and technical meetings in the Southwest. Both the headquarters for the technical meetings and welding and allied industry exhibits are fully air conditioned. Advance notice is now being sent to the welding and allied industries suggesting that advance reservations be made through the office of the National Secretary of the American Welding Society, 33 West 39th Street, New York 18, N. Y.

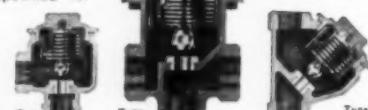
Leading Processor SHORTENS OPERATION from 65 to 45 Min.

with Nicholson Steam Traps

Records of a recent installation of Nicholson steam traps, by a large processor, show they cut cooking time 30%: e.g., one operation was shortened from 65 to 45 min. Nicholson units keep equipment full of live steam because: 1) they operate on lowest temperature differential; 2) have 2 to 6 times average drainage capacity. Also record low for steam waste; and maximum air-venting capacity. Widely specified for preventing damage to thin gauges; eliminate cold blow in unit heaters.



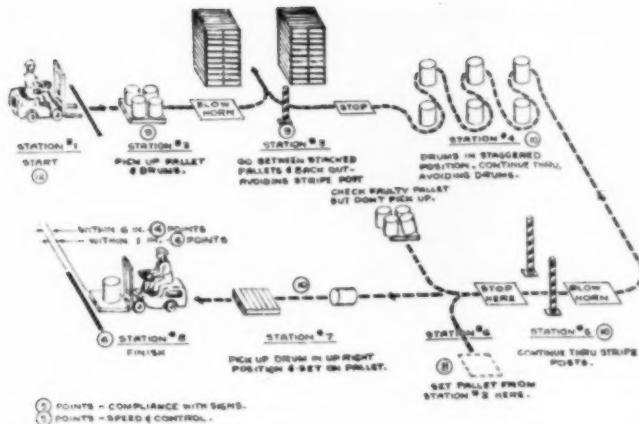
175 OREGON ST.
WILKES-BARRE, PA.



5 TYPES FOR EVERY PURPOSE—Size 1/4" to 2", pressures to 250 lbs. BULLETIN 152.

HIGH-PRESSURE FLOATS — Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. BULLETIN 650.

W.H. NICHOLSON & CO.
TRAPS • VALVES • FLOATS



Fork Truck Lift Rodeo Sponsored by Nitro, West Virginia, Plant

THE emphasis on precision driving of fork trucks in industry has developed to a point where more and more companies feature annual contests to determine their best driver. Monsanto Chemical Company's Rubber Service Division at Nitro, W. Va., sponsored such a competition at a recent plant picnic.

These contests are popularly called "rodeo," but the term is misleading as "cowboy-ing" is conspicuously absent. At the Monsanto picnic, judges awarded points for compliance with safety rules and directions. Drivers were required to pass up unsafe loads and were judged in part on their abil-

ity to quickly recognize such loads.

An obstacle course was laid out to test actual driving ability. Each man was timed as he drove his truck through the narrow, winding aisles of the course. At one station, the driver was required to pick up a metal drum, turn it upright and place it on a pallet, and then place the pallet within 6 in. of the finish line.

Two Monsanto drivers, Paul McClanahan and Cecil Burford, tied twice on two trips through the course. Accordingly, the judges declared them co-champions. Prizes were provided by the dealer in the area for Clark industrial trucks.

Second Gas Turbine at Belle Isle Station—Oklahoma

After three years and 23,000 hours of operation of a GENERAL ELECTRIC gas turbine without service repairs, the OKLAHOMA GAS AND ELECTRIC COMPANY has placed a second 4,000 kilowatt gas turbine unit in service at its Belle Isle generating station, it was announced recently by D. S. KENNEDY, president and general manager of the company.

Mr. Kennedy said that installation of the original gas turbine unit three years ago was the first commercial use of a gas turbine for electric power generation in the United States.

Although the first unit has a rated capacity of 3500 kw, the average load for the three-year period has been over 4400 kw, or more than 120 per cent of its rating.

The second unit, which began commercial operation in July, is essenti-

ally a duplicate of the first. Improvements in design and manufacture have made possible the rated capacity of 4,000 kw. It is expected that under favorable conditions, the new machine will deliver up to 5,000 kw.

The two gas turbine units and two larger steam turbine-generators in the Belle Isle powerhouse use natural gas as fuel. The exhaust of the two gas turbines is used to heat boiler feed-water for the steam units whose total rated capacity is 50,000 kw.

Wagner Electric—Memphis

WAGNER ELECTRIC CORPORATION, 6400 Plymouth Ave., St. Louis, Mo., has announced the appointment of ARTHUR H. BEASLEY as Manager of its MEMPHIS Sales Branch. Mr. Beasley succeeds MR. A. CALLAWAY ALLEN, who recently became Sales Manager of Wagner's Electrical Division.

For a Small, Localized Supply of Warm or HOT WATER Use POWERS STEAM and WATER MIXERS



ECONOMICAL—Quickly pay back their cost. Thousands now in use. Easy to install. Requires steam and water pressures above 10 lbs. Steam is mixed directly with water.

MANY USES—Industrial processes; 180° F. sterilizing rinse water for dishwashers; washing oil drums, trucks, etc.



TEMPERATURE RANGE—Any temperature desired between that of incoming water and 200° F.

HAS PRESSURE EQUALIZING VALVE—which prevents delivery temperature changes caused by fluctuating pressures of steam or water.

SMALL SIZE— $\frac{1}{2}$ " pipe size can be held in the palm of the hand, has 5" dial; $\frac{3}{4}$ " size has 7" dia. dial.

CAPACITIES—based on steam and water at 45 lbs. pressure each, water at 60° F., and delivery temperature of 160° F.; $\frac{1}{2}$ " size = 3 gals. per min.; $\frac{3}{4}$ " size = 8 gpm. Mixing steam with 140° F. water increases delivery about 75%. Often used as a small booster heater.

WRITE for Bulletin 358-S

MAIL TO
THE POWERS REGULATOR CO.
ATLANTA, GA., 142 Spring St., N. W.
Please Send Bulletin 358-S and prices

Name Title

Firm Name

Address

news for the South and Southwest (continued)

Micro-Wave System For Potomac Edison

Work has been started by the POTOMAC EDISON COMPANY on the installation of a micro-wave radio system to operate between Marlowe Substation, near Williamsport, Md. and Ridgeley Substation, near Cumberland, Md.

This micro-wave system is similar to the one which was recently constructed to carry television programs to the west coast, and, when completed, will provide communication, metering and radio control facilities simultaneously over a single radio channel. The total cost of the project is estimated to be over \$65,000.

Installation will consist of transmitting and receiving equipment at both Marlowe and Ridgeley with three "repeater" stations at intermediate locations. As micro-wave radio signals travel only in a straight line and a limited distance, it is necessary to install these "repeater" stations to receive, amplify, and re-transmit the signals to the next station.

One of these "repeater" stations will be located on a mountain just

west of Cumberland and will be used to control a short wave radio base station. This base station will be used to enable construction and maintenance crews to maintain communications with their headquarters in times of emergency. Outages to customers will also be minimized, as direct base-truck communications will be used to rush crews to scenes of troubles.

Ingalls Iron Elects Officers

The Board of Directors of THE INGALLS IRON WORKS COMPANY, BIRMINGHAM, ALA., has been increased by the addition of ROBERT I. INGALLS, JR., MONROE B. LANIER, D. W. STRICKLAND, all of Birmingham and JEROME G. TAYLOR, of Knoxville, Tennessee.

The Board elected, as Chairman of the Board, Robert I. Ingalls, Jr., and continued in office for the ensuing term all of the present officers of the company, including K. H. GAYLE, JR., President. M. F. PIXTON, formerly Vice-President, was elected to the newly created office of Executive Vice-President.

Monro B. Lanier, President of The Ingalls Shipbuilding Corporation, was elected Chairman of the newly formed Executive Committee.

Control Equipment—S. E.

R. P. SAUNDERS, of the CONTROL EQUIPMENT COMPANY, 1222 Peachtree St., N. E., ATLANTA 3, GEORGIA, announces that his firm represents the following companies:

Automatic Temperature Control Co., and Tace West Corp.—Georgia, Alabama, Florida, Eastern Tennessee.

Panellit, Inc., Palarm Products, Inc., and Panascan, Inc.—Georgia, Alabama, Northern Florida, and the counties in South Carolina bordering Georgia.

Instruments, Inc.—all of Georgia north of Macon and including Macon, Alabama, Eastern Tennessee and those counties in South Carolina bordering Georgia.

American Engineering Co. Appoints Pagels, Messaros

AMERICAN ENGINEERING COMPANY, Philadelphia, Pa., announces the appointment of MR. H. PAGELS as Vice President in Charge of Manufacturing, and of MR. F. C. MESSAROS as Vice President in Charge of Engineering.

Detroit Stoker Vice-Pres.

DETROIT STOKER COMPANY of Detroit, Mich., announces the appointment of MAYNARD H. SNOODGRASS as Vice-President-Sales.

Mr. Snodgrass was formerly Sales Manager of the New York District of the Detroit Stoker Company. His new headquarters will be in the General Sales and Engineering Offices of the Company in the General Motors Building, Detroit. Simultaneously the Company announces the appointment of GEORGE S. HODGES as Sales Manager-Detroit District.

The entire efforts of the Detroit Stoker Company, since 1898, have been devoted to the design, application and manufacture of stoker equipment exclusively. As builders of several types of stokers applicable to all types and makes of boiler or steam generator, they are in position to furnish firing equipment suited to individual requirements, ranging from firebox heating boilers to large steam generators having a capacity up to 400,000 lb of steam per hour.



Tube Stocks and Bending

BOILER TUBE CO. OF AMERICA

MCKEE'S ROCKS, PA.
(Pittsburgh District)

PITTSBURGH
CHICAGO

FRED S. RENAUD & CO.,
LOS ANGELES

Penn Appoints Eggelhof

PENN INDUSTRIAL INSTRUMENT CORPORATION, Philadelphia, Pennsylvania, manufacturers of a complete line of flow meters, as well as pressure, temperature, and level instruments, pneumatic transmitters and air operated controllers, announces the appointment of EGELHOFF ENGINEERS, INC., as its representatives in the Texas-Oklahoma area. Eggelhof Engineers, Inc., has an extensive organization geared toward furnishing reliable engineering service throughout the area. Offices are located in HOUSTON, DALLAS, CORPUS CHRISTI, SAN ANTONIO, SHREVEPORT, TULSA and FORT WORTH.



Converted Bus Serves as Mobile Office For Potomac Edison Construction Jobs

Butler Joins Temco, Dallas

J. T. BUTLER, previously with North American Aviation, Inc., where he was in charge of the hydraulic machine shop and hydraulic assembly plant, has been named chief tool engineer at TEMCO AIRCRAFT CORPORATION, DALLAS, TEXAS.

Higgins, Inc.—New Orleans

The Board of Directors of HIGGINS, INC., NEW ORLEANS, LOUISIANA, recently elected ANDREW J. HIGGINS, JR., as president of the company, to succeed his father who died on Aug. 1. FRANK O. HIGGINS was named to the position of vice-president and general manager.

L. M. Smith Made President of Alabama Power Company

JAMES M. BARRY of BIRMINGHAM, president of the Alabama Power Co., has been named chairman of the newly created executive committee of the SOUTHERN COMPANY.

At a recent meeting of stockholders, by-laws of Southern were amended to provide for an additional director and for the establishment of an executive committee. Mr. Barry was then named a director, and was appointed by the board of directors to head the new executive committee.

Although he will remain as a director of Alabama Power, Mr. Barry is giving up his position as head of the company to devote full time to his new assignment. LEWIS M. SMITH, vice president and general manager of Alabama Power, was named president of the company to succeed Mr. Barry, and E. W. ROBINSON was advanced to general manager, succeeding Mr. Smith.

The Southern Company is parent firm for the GEORGIA, ALABAMA, GULF and MISSISSIPPI power companies.

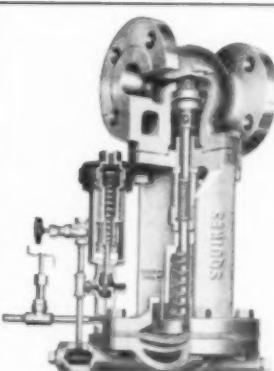
Crews of the POTOMAC EDISON COMPANY have been using this mobile office while on line construction jobs. The office is made from a converted bus, formerly used by PE on the Hagerstown, Md., city routes. It serves as operating headquarters for the construction men and is driven from place to place as needed.

In the photos, Jack Miller of Lonaconing, Md., a member of the Potomac Edison Transmission Line Construction Department, is shown with the mobile office. When photos were taken,

bus was located near Frostburg, Md., as crews worked on the 132 kv Albright-Ridgley line. Office was then moved to North Mountain, West Va., and used in connection with the Ridgeley-Marlowe 132 kv line.

These lines will connect Potomac Edison territory with the new generating station being constructed at Albright, West Va., by the Monongahela and Potomac Edison Companies which are "sister" organizations in the West Penn Electric System.

Photos courtesy Potomac Edison



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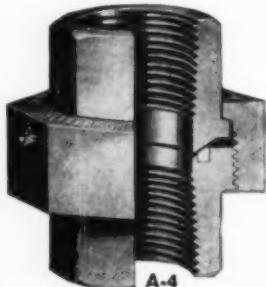
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news (continued)

Nooter Erects Stack for Union Electric, St. Louis

THE NOOTER CORPORATION of ST. LOUIS, custom fabricators and erectors of smoke stacks, tanks and pressure vessels, has just completed construction of the tallest steel stack in the St. Louis area for the UNION ELECTRIC CO. at its Meramec Power Station.

The new structure stands 250 ft high, has a base of 25 ft 5 in. diameter which tapers to a 12 ft 5 in. diameter at the 50 ft level. Designed to be completely self-supporting, the stack requires no guy wires.

This stack is the first of two such stacks to be erected by Nooter at the Meramec Power Station. The later twin stack, like the present one, will be of all-welded steel construction and of self-supporting design.

Mississippi Power Company Receives Safety Award

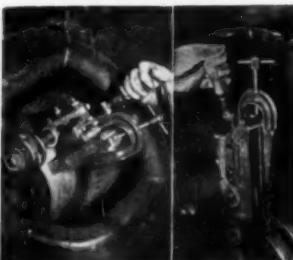
MISSISSIPPI POWER COMPANY has received a Safety Merit Award from the Edison Electric Institute for working one million manhours without a disabling accident. This covers the entire company personnel for the period October 23, 1951, to July 24, 1952. The company has continued this record up to this time.

In a letter of transmittal accompanying the certificate the secretary of the E.E.I. Safety Merit Award Committee stated that there have been only 28 such awards made to entire companies since the program began several years ago.

S. L. MUTHS, vice-president and general manager of the company, in discussing the award, said: "We are very proud of this award from the Edison Electric Institute. It is recognition of the safety consciousness of all employees. We think that it is a particularly fine achievement because it means that for one million manhours none of our employees have suffered as the result of an accident. The elimination of human suffering is the true goal of an accident prevention program. That has always been our goal."

"We have a very active safety program but at the same time we feel that the credit should go to the employees. Many of them are out in all kinds of weather, often working long hours, and working against time to repair damage and restore service in the shortest possible time. They have certainly earned this award," said Mr. Muths.

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Sterling Electric Motors Appoints Ziegler—K.C.

The appointment of Mr. HERBERT F. ZIEGLER, Jr., as manager of the KANSAS CITY, MISSOURI District Office of STERLING ELECTRIC MOTORS, INC., has been announced.

Mr. Ziegler is a native of Kansas City and is a graduate of Notre Dame University. He has wide experience in industrial sales and is prepared to render motor application service to the industrial needs of the area. The District Office address is 1207 Grand Avenue, Kansas City, Mo.

Schenley Safety Record—Ky.

Power plant employees at SCHENLEY'S BERNHEIM DISTILLERY, Seventeenth and Breckenridge Streets, LOUISVILLE, KENTUCKY, have completed 2,000 calendar days of round-the-clock operation without a lost-time accident.

The 27-man department is under the supervision of ROBERT W. COOPER, Bernheim power plant engineer and chairman of Louisville's Special Smoke and Air Pollution Committee of the National Association of Power Engineers.

Cooper-Bessemer—Tulsa

The assignment of ROBERT E. HENSLEY to COOPER-BESSEMER'S TULSA office was recently announced. Working under the direction of BYRON L. POTTER, branch manager, Mr. Hensley will concentrate his efforts to engineering the installation of diesel engines, gas and air compressors for pipe lines, refineries and chemical plants in the Oklahoma area.

An engineering graduate of Oklahoma A. & M., Mr. Hensley received his specialized training in engine and compressor operation at the company's headquarters plant.

Giant F-M Engine Shipped to Denton, Texas Plant

A giant 3,500 hp FAIRBANKS-MORSE engine weighing nearly a quarter million pounds has been shipped from the F-M plant at Beloit, Wisconsin, on a single railroad car. It is destined for DENTON, TEXAS, where it will add 2,500 kw to the generating capacity of the Denton municipal power plant.

Because of limited crane capacity, the huge engine, after final assembly and testing, was torn down and reassembled on the special heavy-duty flatcar. Normally, an engine of this size is shipped only partially assem-

bled and requires three flatcars. The new method, instituted with this engine, is to assemble the unit at the factory as completely as shipping facilities permit. This effects substantial savings in crating at Beloit and in final erection at the purchaser's plant.

The engine, as shipped, was nearly 17 ft high and weighed 214,800 lb. Width and height clearance had to be checked with several railway systems involved in the routing and travel was restricted to 25 miles an hour in daylight only. Because of clearance problems, a 30,000 lb top section which would have added 2 ft in height was left off as were units for side mounting.

Daniel Construction Company Awarded Pinopolos Contract

The foundation is complete and work has started on the new super structure of the PINOPOLOS STEAM POWER STATION at MONCKS CORNER, SOUTH CAROLINA.

This new 80,000 kilowatt station of the South Carolina Public Works Authority was designed by the engineering firm of FORD, BACON & DAVIS and is being built by the DANIEL CONSTRUCTION COMPANY of GREENVILLE,

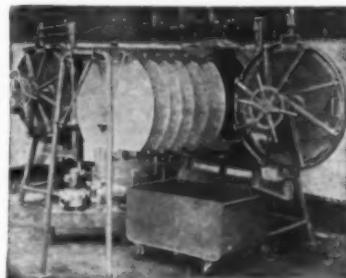
SOUTH CAROLINA, and BIRMINGHAM, ALABAMA. Cost of the plant is estimated at \$14,300,000.

Central Power and Light Co. New Generating Station

CENTRAL POWER AND LIGHT COMPANY has completed a \$4,500,000 addition to its Victoria Power Station, thus substantially increasing the electric power supply available to SOUTH TEXAS. The new plant has a net production capability of 33,000 kilowatts.

Victoria Power Station is now the third largest of eleven major plants in the CPL system, exceeded in size only by Nueces Bay Power Station at Corpus Christi and La Palma Power Station at San Benito. The total power supply now available to South Texas through the Central Power and Light Company system amounts to 305,100 kilowatts, or 2½ times the supply available five years ago. Although the supply is well above the maximum demand to date, further expansion is in progress in anticipation of continuing economic growth throughout the area served by CPL.

Electric generating equipment al-



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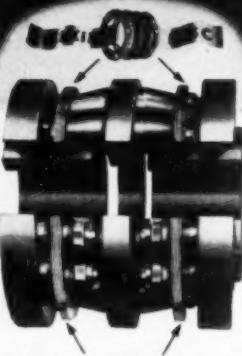
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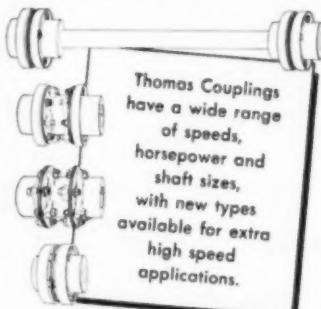
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ready on order will add 165,000 kilowatts to the CPL system within the next three years. Construction will begin this year on the new Lon C. Hill Power Station near Calallen, which is scheduled for service early in 1954 with an initial net capacity of 66,000 kilowatts. Victoria Power Station will be further enlarged in 1955 with the addition of a 66,000 kilowatt generating unit. A 33,000 kilowatt generating unit is also on order now and scheduled for service in 1955 at a site yet to be determined.

Books for the Plant Engineer

Adhesives for Wood

By R. A. G. KNIGHT

PUBLISHED BY THE
CHEMICAL PUBLISHING Co., INC.
26 Court Street, Brooklyn 2, N. Y.
242 pages

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"Adhesives for Wood" includes in addition to the subject of joining wood to wood, joining of wood to metals and plastics. Among the topics covered are plywood; veneering; durability of glues; blood albumin; casein glue; vegetable protein derivatives, phenol-formaldehyde, urea-formaldehyde, polyvinyl and polyurethane adhesives; synthetic resin glue extenders; protection against fungal decay; preservatives; casehardening; and d other pertinent subjects.

The Engine Indicator

By J. D. HINES

PUBLISHED BY
THE COOPER-BESSEMER CORPORATION
Mount Vernon, Ohio

53 pages

Price, \$1.50

"The Engine Indicator for Performance Evaluation" is prepared by John D. Hines, Research Engineer for The Cooper-Bessemer Corporation, to assist operators of gas and diesel engines in keeping equipment at top operating efficiency.

Emphasis is placed on the proper indicator and its correct application in improving performance of reciprocating engines and compressors. The booklet also shows how to analyze indicator cards and suggests how this data can be used for balancing engine cylinders and calculating Mean Indicated Pressure. Procedures for avoiding mechanical inaccuracy in the setup of indicators are included.

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B-10 LADDERS AND SCAFFOLDS—

Bulletin G265, 8 pages—Guide to selection and use of ladders and scaffolds for off-the-ground plant maintenance operations including painting and cleaning, electrical work and equipment maintenance; plant repair and maintenance, and special jobs. Illustrated with applicational photographs and diagrams.—THE PATENT SCAFFOLDING CO., INC., 38-21 12th St., Long Island City, L. N. Y.

B-11 LUBRICATION ON BALL BEARINGS—

Booklet, 8 pages—“The Lubrication of Fafnir Ball Bearings” discusses the everyday problems of ball bearing lubrication and maintenance; reasons lubrication is necessary; advantages of oil or grease; and specific illustrations of bearing and housing design are shown.—THE FAFNIR BEARING COMPANY, New Britain, Conn.

B-12 VISIBLE RECORDS—

Folder KD-705, 4 pages—“Simplified Preventive Maintenance” describes in detail how Kardex maintains and controls machine inspections and maintenance operations with a minimum of paperwork. Outlines Kardex property records which show all essential facts on the machines and equipment of an organization.—REMINGTON RAND, INC., 315 Fourth Ave., New York 10, N. Y.

organization.—REMINGTON RAND, INC., 315 Fourth Ave., New York 10, N. Y.

B-13 CONVEYOR BELTING—

“Conveyor Belting Bulletin,” 8 pages—Describes the company's conveyor belts and explains how B-G construction is designed to defeat major causes of belt failure, with explanatory illustrations. Includes belt selection tables and specifications, and discussion of belt protective equipment.—BARBER-GREENE COMPANY, Aurora, Ill.

B-14 ELECTRICAL EQUIPMENT—

Booklet B-529B, 36 pages—Describes electrification in all phases of production in the lumber industry, including standard and special equipment. Photographs and applicational data take the reader on a tour of a typical lumber mill, describing approximately 21 phases of the application of electric power. Covers drives, lumber handling systems, automatic control systems, air handling, and mill lighting.—WESTINGHOUSE ELECTRIC CORP., Box 2699, Pittsburgh 20, Pa.

B-15 LEAK STOPPAGE—

Data Sheet, 1 page—Describes “Disswick,” a liquid that is said to stop direct leaks below grade in 30 seconds without removing hydr-

static pressure; discusses laboratory development and properties.—DASCO CHEMICAL COMPANY, INC., Baltimore 31, Md.

B-16 WASTE TREATMENT—Bulletin B-I-F No. 4, 8 pages—“Industrial Waste Treatment Guide” contains table showing different types or combinations of unit treatment processes for more than 30 wastes; table showing equipment used in the several unit treatment processes; and a table showing the company's equipment available for use in these waste treatment processes. Installation photographs.—B-I-F INDUSTRIES INC., 345 Harris Ave., Providence, R. I.

B-17 PUMP MOTOR—

“Verticlosed Bulletin,” 16 pages—Engineering data includes discussions of tandem bearings, dual balancing of rotors and the complete motor assembly, use of automatic tachometers for preventing the motor from spinning backward, comparisons of solid shaft and hollow shaft designs, and types of lubrication. Illustrates above design improvements.—ELECTRICAL MOTORS INC., Box 2858, Los Angeles 54, Calif.

B-18 SOOT BLOWERS—

Bulletin 1002, 8 pages—Illustrates and describes Vulcan Long Retractable Soot Blowers, with air and electric drives, suitable for travels of more than 20 ft. to blow with steam or air without change in original equipment, and with rotating and transversing speeds independently adjustable.—COPES-VULCAN DIVISION, Erie 4, Pa.

B-19 SHEAVES—

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B-20 EVAPORATORS—

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B-21 STEAM CLEANER—Bulletin 125, 4 pages—Illustrates and describes steam cleaning machine designed for heavy duty, with rated steam capacity of 300 gpm and exclusive rinsing-washing feature which delivers 1,000 gpm hot or cold water at 500 psi—KELITE PRODUCTS, INC., 1250 North Main St., Los Angeles 12, Calif.

B-22 FORK TRUCKS—“Fork Truck Comparison Chart,” 4 pages—Lists 27 buying guides to permit potential fork truck buyer to quickly make comparisons of various fork truck makes; has space for comparative analysis of the several points—LEWIS SHEPHERD PRODUCTS, INC., Dept. R-1, Watertown, Mass.

B-23 CENTRIFUGAL COMPRESSORS—Bulletin 109, 12 pages—Covers functions, applications, ratings, features of design, arrangements and methods of control on the company's line of screw and centrifugal compressors—THE AMERICAN BLOWER CORPORATION, Detroit 32, Mich.

B-24 FLEXIBLE COUPLINGS—Catalog 50, 58 pages—Illustrates and describes complete line of flexible couplings, variable-speed transmissions and universal joints. Features Type “C” coupling design on which load cushions are kept in place by outside steel collar; multiple leaf spring adds 50 percent to safe maximum speed, and on which no lubrication is required. Detailed “Selection Charts” are included—LOVEJOY FLEXIBLE COUPLING COMPANY, 5661 W. Lake Street, Chicago 44, Ill.

B-25 WATER COLUMNS & GAGES—Bulletin 5-52, 4 pages—Illustrates and describes the company's line of specialties including round body water gage; safety water column; round body bronze

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gage; and other liquid level gages for boilers, both stationary and locomotive. Includes tables of specifications—ERNST WATER COLUMN & GAGE CO., 250 N. Livingston Ave., Livingston, N. J.

B-26 HEAT TRANSFER APPARATUS—G-R News, 8 pages—Presents heaters, coolers, condensers and heat exchangers for all types of liquids, vapors and gases. Shows various types of apparatus of interest to oil and gas industry, power plants, general industrial and chemical plants. Illustrated—THE GRISCOM-RUSSELL CO., Dept. E, Massillon, Ohio.

B-27 AIR COOLERS—Catalog No. 1652, 4 pages—Discusses Supercharger Air Intercoolers, designed for cooling compressed air between the supercharger blower and the air manifold leading to cylinders of engines, diesel, natural gas, oil, fuel, air, others. Describes two types of supercharging systems for use with reciprocating engines—YOUNG RADIATOR COMPANY, 724 Marquette St., Racine, Wis.

B-28 REFRIGERANT PURGER—Bulletin No. 221, 4 pages—Describes forged steel purger for venting air and other non-condensable gases from refrigerating systems. Discusses the air system, explains how the purger operates and gives piping and data information. Includes installation photographs—ARMSTRONG MACHINE WORKS, Three Rivers, Mich.

B-29 MECHANICAL CRUSHING—Bulletin No. 452, 12 pages—Explains in non-technical manner the various crushing

methods and where they apply in crushing procedure. Illustrated with detailed diagrams and illustrative photographs showing facilities for test-crushing any material—PENNSYLVANIA CRUSHER COMPANY, 1700 Liberty Trust Bldg., Philadelphia 7.

B-30 CENTRALIZED INSTRUMENTATION—Bulletin 85-29, 32 pages—Describes conventional and graphic type panelboards, as well as the measuring and control instruments utilized, with typical installations, and application photographs—MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, Brown Instruments Division, Wayne and Windrim Aves., Philadelphia 44, Pa.

B-31 AIR CONDITIONING—Bulletins 8-362-A and D-282—Describe new line of medium-tonnage, self-contained air conditioners, with integral evaporative condenser. Design, specification, and installation data are included. Illustrated—THE TRANE COMPANY, La Crosse, Wis.

B-32 FUNDAMENTALS OF INSTRUMENTATION—Booklet 80-2, 126 pages—Covers the fundamentals of measurement, control and transmission of variables encountered in industry. Complete sections cover: Fundamentals of Measurement and Control; Measurement of Process Variables; Remote Transmission of Measurements; Types of Automatic Controllers; Power Units and Final Controls; Elementary Process Transducers; and Typical Applications—MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, Brown Instruments Division, Wayne and Windrim Aves., Philadelphia 44, Pa.

B-33 PIPE FITTINGS—Brochure, 6 pages—Malleable iron fittings for small piping are described, with more than 100 different types and sizes, straight and reducing sizes $\frac{1}{2}$ in. through 2 in. Prices, weight, and dimensions are given. Illustrated—TEXAS LAWN SPRINKLER CO., INC., 5422 Redfield St., Dallas, Texas.

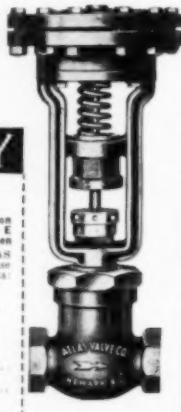
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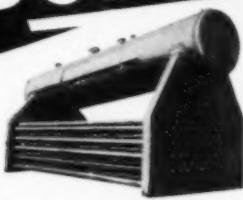
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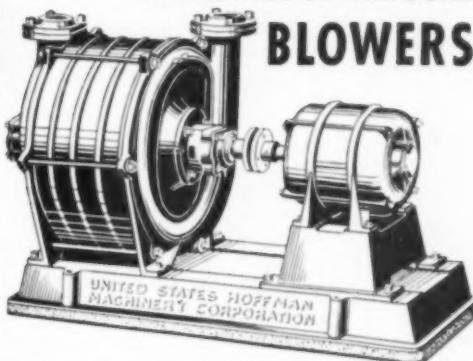


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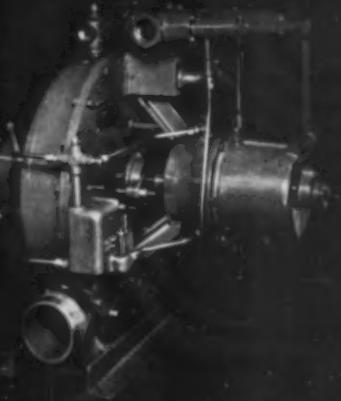
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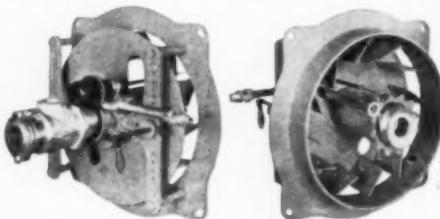
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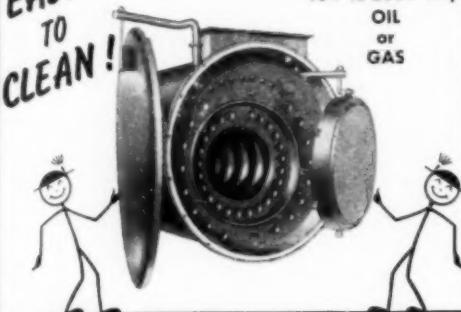
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Ion Exchange Resins

- Permutit motor operated valves make regeneration of the Mixed Bed Demineralizer completely automatic. This gives more positive control . . . eliminates the dangers of costly human errors—and takes less time . . . saves man-hours formerly spent in regeneration. In a recent installation for a 1450 psi boiler, two compact Permutit Mixed Bed units fill all make-up requirements . . . supply demineralized, silica-free water continuously and automatically—even if one unit is out of service. What better way to eliminate boiler scale and silica deposits on turbine blades!

MINERAL IMPURITIES REACH VANISHING POINT

An almost infinite number of separate ion exchange steps take place simultaneously in the homogenous mixture of anion and cation exchangers. Result—mineral content so low that conventional water analysis methods cannot determine the minute quantities remaining. The effluent of a Permutit Mixed Bed Demineralizer has contained *total* electrolytes of less than 0.1 ppm . . . and silica below 0.01 ppm! (Most

commercial distilled water contains 10 to 50 times more electrolytes . . . costs much more to produce.)

TWO AMAZING RESINS DO THE JOB

Highly efficient Permutit Q and Permutit S do the whole job under positive automatic control in the Mixed Bed Demineralizer. Permutit Q is a high capacity hydrogen cation exchange resin that is extremely resistant to wide pH ranges, high temperatures, and oxidizing conditions. Permutit S, a strongly basic resin with a high reaction rate, reduces silica to a range far lower than previous methods.

New Booklet—DEMINERALIZATION BY ION EXCHANGE

This interesting new bulletin describes the key methods of demineralizing water and removing silica by ion exchange.

For your copy, write to: The Permutit Company, Department SI-12, 330 West 42nd Street, New York 36, N. Y. or the Permutit Company of Canada, Ltd., 6975 Jeanne Mance Street, Montreal.

PERMUTIT®

The sole manufacturer of all types of cation and anion exchangers and equipment.
THE PERMUTIT COMPANY, Dept. SI-12
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6975 Jeanne Mance Street, Montreal.
ION EXCHANGE AND WATER CONDITIONING HEADQUARTERS